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Volume VI, Number 10 October 1983 $2.50 ($3.00 Canada, £1.75 UK.)

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Apple PugetSound Program Library Exchange

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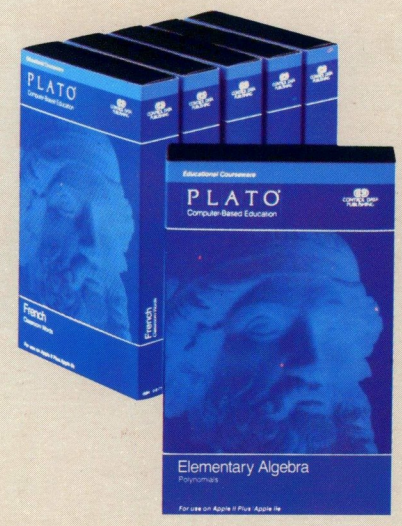

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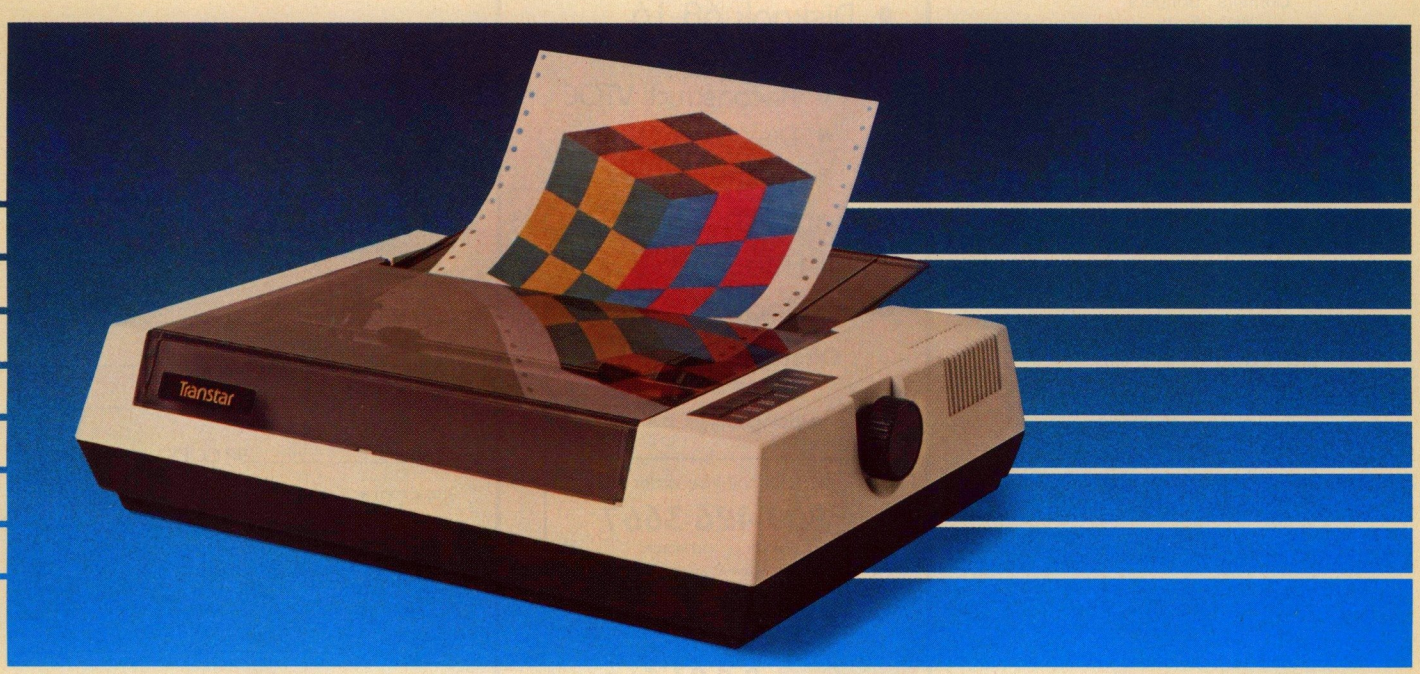

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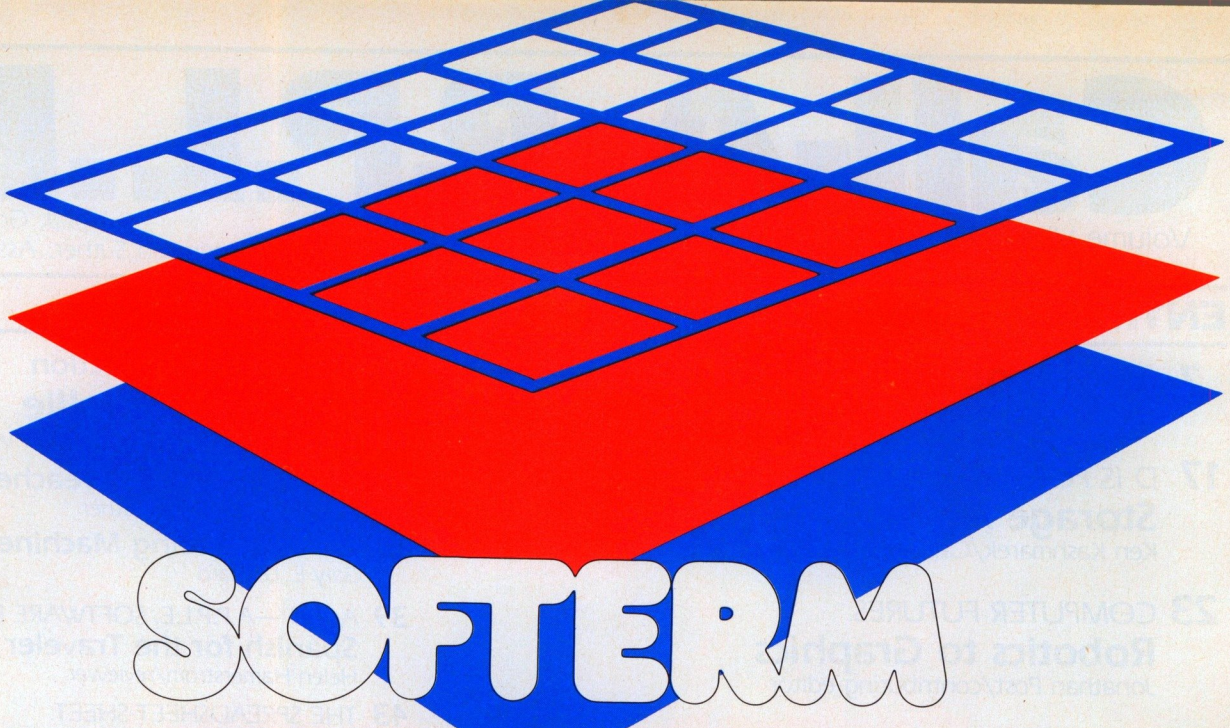

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Softerm 1 is a powerful and flexible terminal emulation program that operates on an Apple® II, II Plus, or IIe to provide basic terminal communications to a variety of host computers, timesharing services, and information services such as *The Source*,℠ *CompuServe*® *and the Dow Jones News/Retrieval*® It operates full or half-duplex at speeds up to 9600 bps using either a direct connection or any standard manual or auto-dial modem. Features include user-defined keyboard macros, built-in phone book for automatic dialing, terminal mode line capture simultaneously to print or disk, copy screen to print or disk, and terminal status display.

DOS, CP/M, and PASCAL File Compatibility Combined In a Single Program

Softerm 1 incorporates an advanced file manager which provides compatibility with DOS 3.3, CP/M, and Pascal disk formats for all file operations including file transfers. And at speeds up to 5 times faster than standard Apple DOS! Built-in disk utilities provide *INIT, CATALOG, RENAME,* and *DELETE* commands for all disk formats. Wildcard match characters can be used whenever filenames are entered.

Local file transfers allow DOS, CP/M, or Pascal files to be displayed, printed, or even copied to another disk. For example, a file on a CP/M formatted disk in Drive 1 could be copied to a Pascal formatted disk in Drive 2 providing a complete format conversion capability. Numerous editing options such as tab expansion and removing unwanted characters allow easy reformatting of data to accommodate the variations in data formats used by host computers.

Multi-Protocol File Transfer Capability

Softerm 1 offers file transfer methods flexible enough to match any host computer requirement. These include the *character* protocol with user-definable characteristics to provide maximum flexibility for text file transfers to any computer. The CP/M User's Group standard *XMODEM* protocol may be used for binary file transfers with systems using the CP/M operating system. The intelligent *Softrans* protocol can be used to transfer *any* type file and provides automatic binary encoding and decoding, error detection and automatic retransmission, and data compression to enhance line utilization. A FORTRAN 77 source program is supplied with Softerm 1 which is easily adaptable to any host computer to allow communications with Softerm using the Softrans protocol. Specific host computer versions of the Softrans FORTRAN program are available on request.

Softerm file transfer utilizes an easy to use *command language* which may be executed interactively or from a *macro* command file which has been previously entered and saved on disk. Twenty-three high-level commands include *DIAL, CATALOG, SEND, RECEIVE, ONERR, MONITOR, HANGUP,* and others. A *SCHEDULE* command even allows file transfers at a specific date and time.

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THE EDITOR BYTES BACK

THE first drawing for our **Readers Choice Card** prize was held at our August membership meeting, and **John P. Brady, Jr.,** member No. 5131 (old timer!) of Clearfield, UT, will receive a credit of $100 toward any A.P.P.L.E. product. This drawing was based on cards returned from the June issue. Similar drawings will be held at each regular monthly membership meeting.

Entering is simple. Just tear the perforated Readers Choice card from this issue, place the numbers 1 (highest) to 10 (lowest) in the boxes next to the story titles, fill in your name, address and membership number and drop it in any handy mail box. Your odds may be better than you think!

Our authors come off pretty well too. **Steve Ross** will receive a $100 cash bonus because his **Spreadsheet Programs** review outranked all others. Stories placing second through fifth were, in order: **Comparing Apples, Creating an Amper-Library, Memory Moves** and **Northern Spy.** The Readers Choice cards are a valuable means of input and help us in selecting stories you want to see. And don't be hesitant to scribble a comment in the margins, if you can find room. . . we read 'em all.

It seems trilogies are the way to go. Northern Spy **Rick Sutcliffe** found a towering topic to talk about when he decided to tell a bit about why the Apple][became so popular and why you should give a closer look to "clones" before plunking your cash down. **The Birds and the Bees: Genetic Engineering** is the first of three Spy chapters you'll enjoy.

On our cover, staff writer **Clay Ruth** holds down first place with his **Mockingboard Speech Editor,** just what you've been wanting for your Mockingboard or perhaps enough incentive to give us a call and order one. Clay promises us more Mockingboard features as well.

What does "trilogy + 1" equal? Does anybody know, because that is what **Ken Kashmarek's** got; **Storage Access** is the second part of his **D is For Data** exploration into the intricacies of PFM.

Contributing editor **Jonathan Post** is contributing to your knowledge in the second of three parts of **Computer Futures.** This issue's topic is **Robotics to Graphics.** All of this got our own **Mike Thyng** fired up enough to add another episode in the saga of MIRT the robot. Look for **The Monster Lives.**

Staff writer **Rick Sutcliffe** (alias the Northern Spy), has come up with the number four feature, **An Apple For Nellie,** which not too surprisingly also heads off our educational section. What has Rick got to say? Hint: he's a teacher.

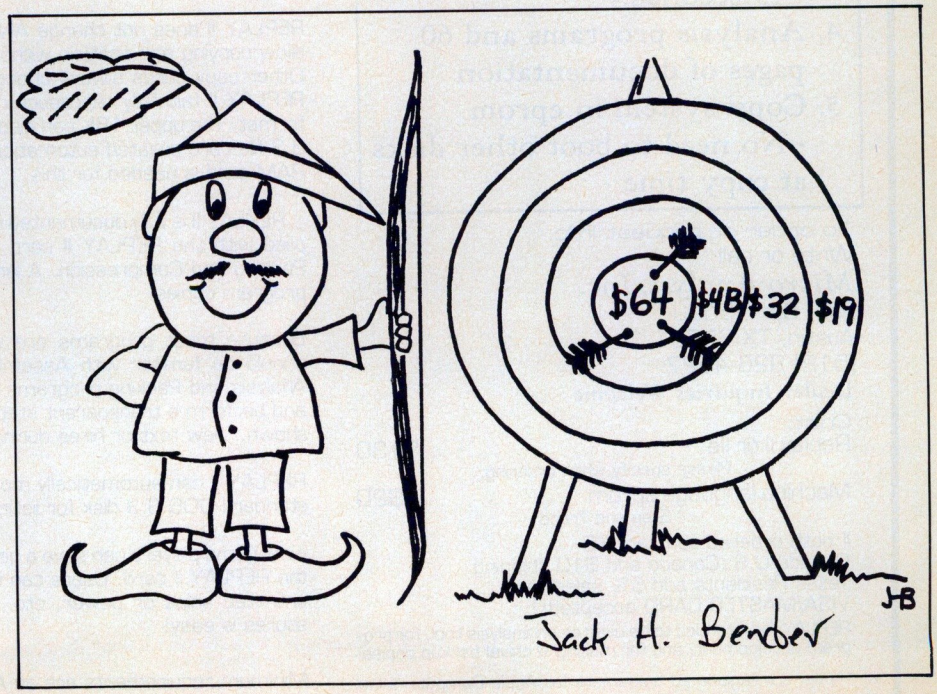
Spreadsheets are fast becoming a way of life for many microcomputer users and we intend to support our **THE Spreadsheet** with **Jeffrey E. Jacques'** new series: **THE Spreadsheet Sheet.** Jeff plans to suggest many new applications for THE Spreadsheet and how to implement them. This issue he covers **Spreadsheets in the Classroom** and demonstrates how THE Spreadsheet can be used for a gradebook.

We're not through with THE Spreadsheet yet, though. **Glen Ferreri** has been using a Soroc video terminal with his Apple for quite some time now, and when he first got his copy of THE Spreadsheet, he found there was no support for an external video terminal, but since the program included a generic video driver (for 80-column cards), Glen went to work and wrote **THE Spreadsheet Video Terminal Driver.** This might be just what you're looking for. . .

We'd like to introduce **Earl Keyser** to our pages. Earl is one of our very early members and the author of our newly released **E-Z Pilot** (see Bytes from A.P.P.L.E.), will be providing support through his new column **Flying High.**

If you're into CP/M, you probably ought to check out this month's **CP/Magic** by **Murrary Arnow.** If you've been having trouble interfacing non-standard devices to BDOS, you may find Murray's info very helpful.

Next month staffer **David Sparks** is going to explain some of the structure of DIF™ files and how to access them from Applesoft, so watch for **What's the DIF** and many more goodies.



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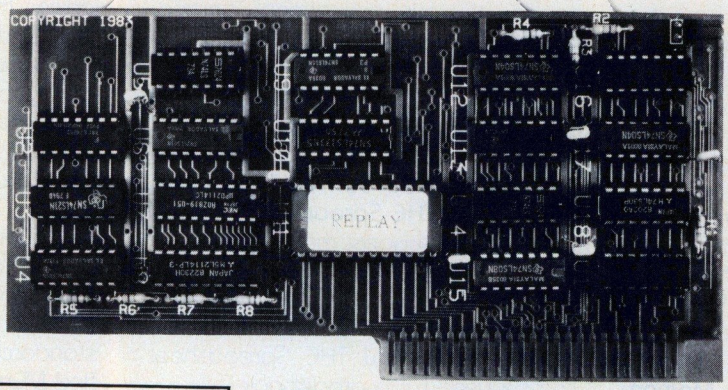

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REPLAY II is intended to be used as an analysis tool, for program development, and for making archival backup copies.

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REPLAY II does not change ANY memory. Extra memory is buffered to allow copying and analysis without altering the original memory contents. Other copy cards always change specific points in the original memory. REPLAY II faithfully reproduces the lower 48K of memory in a fast load format. The upper 16K can also be copied for a 64K copy. Standard DOS 3.3 files are created automatically for storage on floppy or hard disks. A RAM card is needed for this.

REPLAY II is fully documented in a 60 page manual. Utility programs supplied with the REPLAY II card include Program Analysis, Comparisons, Packing and Compression. A language card is not needed to run packed program copies.

Because most programs are written in Assembly language, the user should be familiar with Assembly in order to fully utilize the advanced Analysis and Packing programs. Users can now freeze a binary program and perform a transparent step or trace while continuous disassembly is shown. View text or hires during trace.

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Minimum requirements are an APPLE II and a single disk drive.

BYTES FROM A.P.P.L.E.

Val J. Golding

NEW products is what this column is about. Since 1978 we have brought you information about our new software, developed primarily from within our membership—remember, both *Higher Text, Program Line Editor* and *Big Mac* came up this route and have been national best-sellers (Big Mac under his alter ego name of *Merlin*) were first brought to your attention in this column—and now our monthly member specials, some of which appear *only* in this column. This is one of the several reasons that membership in **A.P.P.L.E.** can save you money. (Of course, if you already belong then we're not telling you anything new.)

Let's talk for a minute about some of our new products; we've brought out quite a few in the last few weeks, and they were also listed in your August product catalog. We now have our own version of the Pilot language, known as *E-Z Pilot,* authored by long-time member **Earl Keyser.** E-Z Pilot is a versatile educator's language which supports *The Mockingboard, Higher Text* and DOS on the RAM card. Earl will be providing information and support about this product in his column *Flying High.* Order code is *SEAP* and the price is $28.50.

Also available now at the bargain price of $22.50 (order code *SAMP*) is *Ampermanager* by **Rick Sutcliffe,** alias the Northern Spy. Ampermanager is a fine collection of ampersand and DOS utilities. It was reviewed by **David Sparks** in the March issue, and while we don't have space to describe our new *Multi-trieve* data base, the *Applesoft Carpenter II* and *Turtlesoft,* these are all new products that may warrant your further investigation.

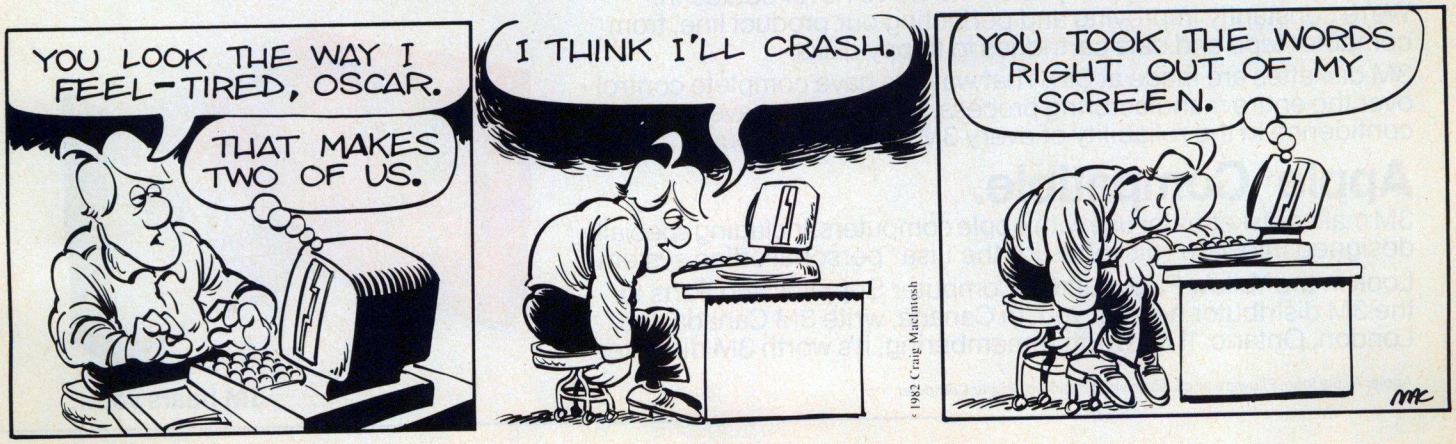
Telecommunications is now so popular among computer users, we went out of our way to locate and test our new low-cost *Modem II* by **Multi-tech.** This is a modem that strictly adheres to all Hayes protocol, yet adds features of its own, such as a speaker to monitor the phone line. The cost? What else... just $195 (order code *HMOD*). If you haven't receive our August product catalog, which contains dozens of hardware and software bargains, send us a large self-addressed envelope with .37 postage and we'll fire one right back.

Many of the hotline calls we receive relate to blown diskettes containing valuable data. Many times recovery is reasonably simple, but requires what is known as a "sector editor," so here is a special you can't refuse: *The DOS Utility Special,* which includes the following: *Diskpak 6B-16, "Beneath Apple DOS," "All About DOS" (issue 3, Call -A.P.P.L.E. in Depth)* and the *All About DOS* diskette set. All these for just $50, a saving of 22% from the regular member price of $64.

Diskpak 6B-16 includes the following DOS utilities: Disk Zap, Reconstruct VTOC, Disk Map, Fix Sector Count, Single/Dual copy and others, all indispensible tools. *Beneath Apple DOS* is a technical manual that takes up where the Apple Computer DOS manual leaves off and includes a listing of all major DOS entry points and brief descriptions of the functions of each. It has received wide recognition as *the* DOS bible. *All About DOS* is our own blend of technical manual and magazine articles with many utilities and techniques to do such things as speed up DOS by 400% or move it to the RAM card, etc., and comes with a two diskette set of the programs in it.

BOOT

Craig MacIntosh



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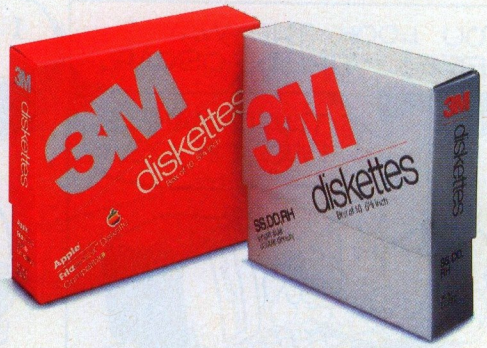

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A Mockingboard Speech Editor

Clay Ruth/Call —A.P.P.L.E. staff writer

JANUARY '83 brought along a special offer from A.P.P.L.E.: the Mockingboard Sound/Speech I with text-to-speech algorithm, from Sweet Micro Systems, at the special member price of $199. I found this offer too good to pass up, and I'm sure many other members felt the same.

The software supplied by Sweet Micro Systems includes several cute demonstrations but little in the way of practical applications. In this article, and probably others yet to come, I will be presenting additional programs to help you put your Mockingboard to good use.

. . . about the author

Clay Ruth, age 32, is a graduate of Purdue University and is a registered professional engineer in the states of Illinois and Indiana. He is employed as an electrical engineer at a large consulting firm in Chicago. He learned BASIC and FORTRAN in college and is self-taught in 6502 assembly language . He purchased his Apple][Plus in early 1980 and soon added an Integer firmware card, two Disk]['s, a Paper Tiger and an Apple Clock. He modified a 13 inch color TV to accept video directly from the Apple without a modulator.

Clay's other hobbies include Amateur Radio Station N9CR, electronics, photography and astronomy. He has become a software publisher on a small scale, producing a contest operating package for his fellow ham radio operators. It was the development of this software that led to "Get the Most from a Diskette" and "Garbagemen Strike," describing techniques he devised for his own product.

Purpose

Speech Writer is a program that allows you to compose speeches for your Mockingboard to recite. It functions in conjunction with Sweet Micro's text-to-speech algorithm. The first thing you should do, if you haven't already, is make a backup copy of the algorithm disk that came with your Mockingboard. Now, key in the Speech Writer program shown in Listing 1 and save it on the algorithm backup. You'll find plenty of room for additional files on this disk.

Features

Speech Writer functions somewhat like a line-oriented word processor. There are some important differences, because the final composition is to be spoken rather than printed. Instead of concentrating on the appearance of the text, this program concentrates on getting it to sound right.

The program is menu-driven. It allows you to compose a speech and have the Mockingboard speak it in parts or in its entirety. You can insert lines, delete lines, append lines, or edit a specified line. You can save your speech, in any stage of completeness, as an ordinary sequential text file for later editing or speaking.

The variables used by Speech Writer are summarized in Table 1. The major parts of the program are headed by REMarks.

Lines 120 through 150 load Sweet Micro's text-to-speech algorithm into memory. If you get a "FILE NOT FOUND" message when you try to run the program, it's because either you forgot to use your backup of the algorithm disk, or else Sweet Micro changed the names of the algorithm files. Catalog your algorithm disk to confirm the spelling of the filenames. The Speech Writer program does not use all of the files on the disk.

Throughout most of the program, the selective string preservation technique (see Garbagemen Strike, Aug. 1982) ensures that the Apple won't go out to lunch in the middle of a speech. However, garbage collection may still introduce a brief pause during an insert or delete operation.

Entering and Editing a Speech

To start a speech from scratch, run the Speech Writer program and select the first choice on the menu: Input New Text (Clean Slate). When you make this selection, any text you have been working with previously will vanish from memory, and the space it once occupied will become available for new text.

Enter the new text on a line-by-line basis. For the purposes of this program, a "line" is anything from 1 to 255 characters, and may consist of any characters except the comma (,) and colon (:). Sound familiar? It should, because these are the same limitations that apply to the Applesoft INPUT statement in general! If you use one of the many versions of "Input Anything" that have appeared in *Call -A.P.P.L.E.*, you won't have to worry about the commas and colons, but it won't really gain you much. Remember, the speech isn't going to be printed, so you don't need punctuation. Whenever you want a pause in the speech, you can throw in a period instead of a comma. The result is the same, and it keeps the INPUT routine simple.

—◉→

A MOCKINGBOARD SPEECH EDITOR

Each time you enter or edit a line, Speech Writer speaks it and offers you a chance to change it. This is necessary because of the wide variations of spelling used in the English language. The text-to-speech algorithm does a very good job, but some words don't come out quite the way you expect them to. Often it becomes necessary to spell phonetically rather than according to the dictionary. Particularly difficult words may have to be broken into parts separated by spaces. For example, to get the Mockingboard to properly pronounce "Caribbean cruise," I had to enter CARE IB B UNCROOZ. Most lines will require three or four attempts before they sound completely accurate. As you become more accustomed to the algorithm's idiosyncracies, you'll get by on fewer retries.

Due to the time taken to process each line for speaking, you should always end a line at the end of a sentence. The pause caused by line processing would be objectionable in mid-sentence, but it sounds natural between sentences. You can combine several short sentences on one line. If the Apple starts to beep on every keypress, you should backspace to the end of the previous sentence and press RETURN. Start the next line with the sentence you were trying to enter when the beeping began. It is also important to end every sentence (including the final one) with a period. This introduces the proper duration pause, and also tells the algorithm that the preceding character was the last letter of a word. Leaving off the closing period can result in some unexpected mispronunciations.

Because the program uses the normal Applesoft INPUT routine, you have at your disposal the standard Applesoft editing features (esc-I,J,K,M plus left and right arrows). Each time you choose to retype a line, Speech Writer reprints the line in its current form and positions the cursor over the first character. Edit the line just as you would an Applesoft program line. If you change something in the middle of a line, be sure to re-copy the rest of it by holding down the right arrow and REPT keys until you come to the end.

When you are finished entering new lines, enter a lone exclamation point (!) to return to the main menu.

```
]LIST

0  REM

"SPEECH WRITER"
A PROGRAM FOR USE WITH
MOCKINGBOARD SPEECH I
OR SOUND/SPEECH I

BY CLAY RUTH,
CALL-A.P.P.L.E. STAFF WRITER

1  LOMEM: 24448: PRINT  CHR$ (4);
     "MAXFILES1"
5 ML = 400: REM  MAXIMUM # OF LIN
     ES
10 D$ =  CHR$ (4): DIM TL$(ML): GOSUB
     50
20 LO% = SL%:HO% = SH%: REM
"CLEAN SLATE" POINTERS
48  GOTO 120
49  REM

SELECTIVE STRING PRESERVATION

50 SL% =  PEEK (111):SH% =  PEEK
     (112): RETURN
51  POKE 111,SL%: POKE 112,SH%: RETURN

59  REM

BAD ENTRY MESSAGE

60  INVERSE : PRINT " BAD LINE NU
     MBER "; CHR$ (7): NORMAL : RETURN

99  REM

LOAD TEXT-TO-SPEECH
ALGORITHM

120  PRINT D$;"BLOADT-S2.OBJ"
130  PRINT D$;"BLOADRULES2.OBJ"
140  PRINT D$;"BLOADRNDX2.OBJ"
150  PRINT D$;"BLOADPHIDRV2.OBJ"
160  POKE 1022,161: POKE 1023,67:
      POKE 25,0

199  REM

MENU

200  TEXT : HOME : PRINT "1) INPU
     T NEW TEXT (CLEAN SLATE)"
210  PRINT : PRINT "2) SPEAK TEXT "
220  PRINT : PRINT "3) SAVE TEXT
     TO DISK"
230  PRINT : PRINT "4) LOAD TEXT
     FROM DISK"
240  PRINT : PRINT "5) MODIFY A L
     INE"
250  PRINT : PRINT "6) INSERT LIN
     E(S)"
260  PRINT : PRINT "7) APPEND LIN
     E(S)"
270  PRINT : PRINT "8) DELETE LIN
     E(S)"
280  PRINT : PRINT "9) QUIT"
300  PRINT : PRINT : INPUT "-> WH
     ICH? ";IN$
310 IN% =  VAL (IN$)
320  IF IN% < 1 OR IN% > 9 THEN 200
330  ON IN% GOSUB 1000,2000,3000,
     4000,5000,6000,7000,8000,60000
340  GOTO 200
999  REM

CLEAN SLATE AND
INPUT NEW TEXT

1000 LN = 0:TL = 0
1010 SL% = LO%:SH% = HO%: GOSUB 5
     1
1020  TEXT : HOME : VTAB 3: PRINT
     "MAXIMUM LINE LENGTH = 256 C
     HARACTERS     INPUT ! TO QUIT
     ": POKE 34,5
1100  GOSUB 50: HOME : PRINT TL$(
     LN):LN = LN + 1: PRINT
1110 VT =  PEEK (37) + 1
1120  PRINT LN;: INPUT ") ";MB$: IF
     MB$ = "" THEN  VTAB VT: GOTO
     1120
1130  IF MB$ = "!" THEN TL = LN -
     1: RETURN
```

Shorthand

The Sweet Micro Systems text-to-speech algorithm has features which enable you to abbreviate some words and syllables with a single character. Any letter standing alone will be pronounced as the name of the character, as will a numeral either alone or embedded in a word. Hence, "threesome" can be abbreviated as "3SUM," "encased" can be "N K SD," and "cue" can be "Q". Numbers such as 197 will be pronounced "one nine seven." If you want "one ninety seven," you can enter 19T7 and all will be fine. A little more spelling is required for 138 (1THIRTY8), but it's still better than spelling out the whole thing. Also, the symbols %, & and @ are each defined in the algorithm, so you won't have to spell them out either. These abbreviations can save time and memory, once you get the hang of it.

You'll have about 13K to work with, and this can be anywhere from 50 lines of maximum length to 400 lines averaging only 32 characters each. The actual number of lines you can enter will depend on the average line length.

Insertions and Deletions

Before selecting either of these options, you should review the speech and make a note of the line numbers affected. If you're planning to insert lines, you should also estimate how many more lines will be needed. If you guess too high, just enter null strings (plain CR) when the program asks you for these extra lines. You can go back and delete them afterward.

It's also a good idea to save the speech to disk before you insert or delete. If the speech is very long, the reassignment of array elements can force garbage collection to occur, in spite of the selective string preservation routines. Although unlikely, it is possible for garbage collection to mess up some of your lines when selective preservation has overwritten some long strings that still have variables pointing to them. Review the text after inserting or deleting, to make sure nothing got messed up. If it did, exit the program, type RUN and load the speech back into memory. On a clean load, garbage collection shouldn't cause any trouble.

When deleting lines in more than one part of the speech, always delete the highest numbered groups of lines first. Whenever lines are deleted, the numbers of all following lines are reduced by the number of lines deleted, so starting at the end makes sure the other lines you plan to delete will still have the same numbers when you get to them. But when the program asks for the number of the first line to be deleted, specify the lowest numbered line of the group. If the "last" line to be deleted is lower than the "first," you'll get a BAD LINE NUMBER message. This will also happen if you specify a line number less than 1 or higher than the total number of lines in the speech.

Appending Lines

You can append new lines to the end of an existing speech. If the speech is one you saved to the disk during a previous run, you must first load it into memory (choice #4 on the main menu). But if it is already in memory and you were just editing it or reviewing it, just select choice #7. You can continue adding lines to the speech until you enter a lone exclamation point, as you did when you first started.

```
1140  CALL 16800: CALL 17280: REM
      SPEAK LINE
1150  CALL  - 958: PRINT : PRINT
     "DOES THAT SOUND ACCEPTABLE?
     ";
1160  GET IN$: IF IN$ <  > "Y" AND
     IN$ <  > "N" THEN 1160
1170  PRINT IN$: IF IN$ = "N" THEN
      VTAB VT: CALL  - 958: PRINT
     LN;") ";MB$: VTAB VT: GOTO 1
     120
1180  GOSUB 51:TL$(LN) = "" + MB$
     : GOTO 1100
1999  REM

SPEAK TEXT IN RAM

2000  HOME : VTAB 4: PRINT "THERE
      ARE ";TL;" LINES OF TEXT IN
      MEMORY."
2010  VTAB 7: PRINT "1) SPEAK ALL
      LINES"
2020  PRINT : PRINT "2) SPEAK A C
     HOSEN RANGE OF LINES"
2030  VTAB 14: INPUT "-> WHICH? "
     ;IN$: IF IN$ = "" THEN  RETURN

2040 IN% =  VAL (IN$)
2050  IF IN% < 1 OR IN% > 2 THEN
     2000
2060  IF IN% = 1 THEN L1 = 1:L2 =
     TL: GOTO 2200
2100  VTAB 16: INPUT "FIRST LINE
     NUMBER = ";IN$
2110 IN% =  VAL (IN$): IF IN% < 1
      OR IN% > TL THEN  GOSUB 60:
      GOTO 2100
2120 L1 = IN%: CALL  - 958
2130  VTAB 18: INPUT "LAST  LINE
     NUMBER = ";IN$
2140 IN% =  VAL (IN$): IF IN% < L
     1 OR IN% > TL THEN  GOSUB 60
     : GOTO 2130
2150 L2 = IN%
2200  HOME : FOR LN = L1 TO L2
2210  GOSUB 51
2220 MB$ = TL$(LN): PRINT LN;") "
     ;MB$
2230  CALL 16800: CALL 17280
2240  ON  PEEK (25) = 255 GOTO 22
     40: NEXT : RETURN
2999  REM

SAVE TEXT TO DISK

3000  HOME : VTAB 4: PRINT "PLEAS
     E ENTER A NAME FOR THE FILE:
     "
3010  PRINT : INPUT N$: IF N$ = "
     " THEN  RETURN
3020  IF  LEFT$ (N$,5) <  > "MOCK
     ." THEN N$ = "MOCK." + N$
3030  PRINT D$;"OPEN";N$
3040  PRINT D$;"WRITE";N$
3050  GOSUB 51: PRINT TL
3060  FOR LN = 1 TO TL
3070  PRINT TL$(LN)
3080  NEXT
3090  PRINT D$;"CLOSE"
3100  RETURN
3999  REM

LOAD TEXT FROM DISK

4000  HOME : VTAB 4: INPUT "INSER
     T DISK CONTAINING THE FILE
AND PRESS RETURN";IN$
4010  PRINT D$;"CATALOG": PRINT
```

A MOCKINGBOARD SPEECH EDITOR

File Names

When you save a speech on the disk, Speech Writer will ask you to name the file. Any string of 1 to 25 characters is valid, even if it begins with a number, for the program will attach the prefix "MOCK." to the name you provide. This makes your Mockingboard speech files readily identifiable on the disk.

When loading a speech from disk to memory, the program will CATALOG the disk for you before asking you which file to load. You need not include the "MOCK." prefix, but it won't hurt if you do. The program tests for this prefix in both Load and Save modes. If you have already included it, the program doesn't add it a second time.

Applications

Now that you can write speeches for your Mockingboard, what can you do with them?

To start with, you could let your computer be the guest speaker at a club meeting. Just write up a discussion on some topic of general interest (such as a review of your experiences with the Mockingboard) and save it on the disk with the Speech Writer program. Set up the system at the meeting, and at program time you simply run Speech Writer, load the speech into memory, select #2 (Speak Text) from the main menu, and select #1 (All Lines) from the submenu. Your computer will do the rest, and it doesn't suffer from stage fright!

There are many other ways you can use the text files created by Speech Writer. If you have a program that you want to modify so that it talks to the user, assign each desired message a line number. Use Speech Writer to put these messages on the appropriately-numbered lines. Save the text with a name such as "MESSAGES." Add the Load Text subroutine (4000-series lines) to the program, but delete the existing lines 4000, 4010 and 4020, substituting 4000 N$="MESSAGES." Delete Line 4060. Insert 4075 DIM TL$(TL).

```
4020  INPUT "NAME OF FILE: ";N$: IF
     N$ = "" THEN  RETURN
4030  IF  LEFT$ (N$,5) <  > "MOCK
     ." THEN N$ = "MOCK." + N$
4040  PRINT D$;"OPEN";N$
4050  PRINT D$;"READ";N$
4060 SL% = LO%:SH% = HO%: GOSUB 5
     1
4070  INPUT TL
4080  FOR LN = 1 TO TL
4090  INPUT TL$(LN)
4100  NEXT
4110  PRINT D$;"CLOSE": GOTO 50
4999  REM

MODIFY AN EXISTING LINE

5000  HOME
5005  VTAB 10: PRINT "THERE ARE "
     ;TL;" LINES IN MEMORY."
5010  INPUT "WHICH LINE DO YOU WA
     NT TO CHANGE? ";IN$: IF IN$ =
     "" THEN  RETURN
5020 IN% =  VAL (IN$): IF IN% < 1
      OR IN% > TL THEN  GOSUB 60:
      GOTO 5005
5030 LN = IN%: CALL  - 958
5040  HOME : ON LN = 1 GOTO 5050:
      PRINT LN - 1;") ";TL$(LN -
     1): PRINT
5050 VT =  PEEK (37) + 1: PRINT L
     N;") ";TL$(LN): PRINT
5060  ON LN = TL GOTO 5070: PRINT
     LN + 1;") ";TL$(LN + 1)
5070  VTAB VT: PRINT LN;: INPUT "
     ) ";MB$
5080  CALL 16800: CALL 17280: REM
      SPEAK LINE
5090  CALL  - 958: PRINT : PRINT
     "DOES THAT SOUND ACCEPTABLE?
     ";
5100  GET IN$: IF IN$ <  > "Y" AND
     IN$ <  > "N" THEN 5100
5110  PRINT IN$: IF IN$ = "N" THEN
      VTAB VT: CALL  - 958: PRINT
     LN;") ";MB$: GOTO 5070
5120  GOSUB 51:TL$(LN) = "" + MB$
     : GOSUB 50: RETURN
5999  REM

INSERT LINE(S)
BETWEEN EXISTING LINES

6000  HOME : VTAB 4: PRINT "THERE
      ARE ";TL;" LINES IN THE FIL
     E."
6010  VTAB 10: INPUT "INSERT HOW
     MANY LINES? ";IN$: IF IN$ =
     "" THEN  RETURN
6020 IN% =  VAL (IN$): IF IN% < 1
      OR IN% + TL > ML THEN  GOSUB
     60: GOTO 6010
6030 IL = IN%: CALL  - 958
6040  VTAB 12: INPUT "INSERT AFTE
     R LINE #";IN$
6050 IN% =  VAL (IN$): IF IN% < 0
      OR IN% > TL THEN  GOSUB 60:
      GOTO 6040
6060 L1 = IN%: CALL  - 958: GOSUB
     51
6070  FOR LN = TL TO L1 + 1 STEP
      - 1
6080 TL$(LN + IL) = TL$(LN)
6090  NEXT :TL = TL + IL: GOSUB 5
     0
6100  FOR LN = L1 + 1 TO L1 + IL
6110  HOME : PRINT TL$(LN - 1): PRINT

6120 VT =  PEEK (37) + 1: PRINT L
     N;
6130  INPUT ") ";MB$
6140  CALL 16800: CALL 17280: REM
      SPEAK LINE
6150  CALL  - 958: PRINT : PRINT
     "DOES THAT SOUND ACCEPTABLE?
     ";
6160  GET IN$: IF IN$ <  > "Y" AND
     IN$ <  > "N" THEN 6160
6170  PRINT IN$: IF IN$ = "N" THEN
      VTAB VT: CALL  - 958: PRINT
     LN;") ";MB$: VTAB VT: GOTO 6
     120
6180  GOSUB 51:TL$(LN) = "" + MB$
     : GOSUB 50
6190  NEXT : RETURN
6999  REM

APPEND LINE(S)
```

In line 4110, change the GOTO 50 to RETURN. Be sure to place the statements from Lines 120–160 near the beginning of the program, along with a GOSUB 4000. Then, wherever your program is to speak a message to the user, use the form MB$=TL$(N):CALL 16800:CALL 17280 (where N is the number of the message desired). This way, you can change the messages easily with Speech Writer without digging into the program, and you'll know how they'll sound without having to do test runs.

Similarly, you can create a "talking HELLO" program which greets the user vocally when booting up. Such a program appears in Listing 2. This program uses the modified speech loading routine described above.

Use Speech Writer to create a speech file called "GREETINGS." Listing 3 is the GREETINGS file I am using on my backup copy of the algorithm disk. If you rename the existing HELLO program to TEXT-TO-SPEECH, you can save the talking HELLO under the name HELLO, and it will read the GREETINGS file to you every time you boot the disk.

If you like, you could randomize the greeting message by creating several different files called GREETINGS1, GREETINGS2, GREETINGS3 etc. Then, if N is the total number of GREETINGS files, insert the following lines:

```
20 N = 10 : REM 10
   GREETINGS FILES
1000 TEXT : HOME : VTAB 8 :
   PRINT "PLEASE PRESS A
   KEY."
1010 X% = RND (0) * N + 1
1020 IF PEEK (-16384) < 128 THEN
   1010
1030 POKE -16368,0
```

Also, change Line 4000 to read:

```
4000 N$ = "GREETINGS" +
   STR$(X%)
```

Now you'll never know which message you'll get when booting up! The wait-for-keypress routine (1000 series lines) avoids the predictability of the random number generator.

When using your MOCK. files on another disk, don't forget to transfer the algorithm files also. FID will do this for you, or you may BLOAD the four files as shown in Lines 120 through 150, then BSAVE SPEECH ALGORITHM,A$4000,L$1F80. Then, your talking programs need only BLOAD SPEECH ALGORITHM instead of BLOADing the four separate files.

Watch for more Mockingboard applications in the months ahead. Meanwhile, have fun with Speech Writer!

```
7000  IF TL = 0 THEN 1000
7010  GOSUB 51:LN = TL: GOTO 1020

7999  REM

DELETE LINE(S)

8000  HOME : VTAB 4: PRINT "THERE
      ARE ";TL;" LINES IN THE FIL
     E."
8010  VTAB 10: INPUT "FIRST LINE
     TO DELETE: #";IN$: IF IN$ =
     "" THEN  RETURN
8020 IN% =  VAL (IN$): IF IN% < 1
      OR IN% > TL THEN  GOSUB 60:
      GOTO 8010
8030 L1 = IN%: CALL  - 958
8040  VTAB 12: INPUT "LAST  LINE
     TO DELETE: #";IN$: IF IN$ =
     "" THEN  RETURN
8050 IN% =  VAL (IN$): IF IN% < L
     1 OR IN% > TL THEN  GOSUB 60
     : GOTO 8040
8060 L2 = IN%:DL = L2 - L1 + 1:TL
      = TL - DL: CALL  - 958
8070  GOSUB 51: FOR LN = L1 TO TL

8080 TL$(LN) = TL$(LN + DL)
8090  NEXT : GOTO 50
59999  REM

QUIT

60000  POP : HOME : END
```

```
]LIST

0  REM

"TALKING HELLO"
A PROGRAM FOR USE WITH
MOCKINGBOARD SPEECH I
OR SOUND/SPEECH I

BY CLAY RUTH,
CALL-A.P.P.L.E. STAFF WRITER

10 D$ =  CHR$ (4)
99  REM

LOAD TEXT-TO-SPEECH
ALGORITHM

120  PRINT D$;"BLOADT-S2.OBJ"
130  PRINT D$;"BLOADRULES2.OBJ"
140  PRINT D$;"BLOADRNDX2.OBJ"
150  PRINT D$;"BLOADPHIDRV2.OBJ"
160  POKE 1022,161: POKE 1023,67:
      POKE 25,0
2000  TEXT : HOME : PRINT D$;"CAT
     ALOG": REM
CATALOG COMMAND MAY BE DROPPED
IF NOT APPROPRIATE FOR
YOUR APPLICATION.
2200  GOSUB 4000:L1 = 1:L2 = TL
2210  FOR LN = L1 TO L2
2220 MB$ = TL$(LN)
2230  CALL 16800: CALL 17280
2240  ON  PEEK (25) = 255 GOTO 22
     40: NEXT
2999  REM

END PROGRAM OR RUN USER PROGRAM

3000  END
3999  REM
```

A MOCKINGBOARD SPEECH EDITOR

Table 1
Variables Used by Speech Writer

D$ -CHR$(4) for use in DOS commands.
IN$ -General-purpose input string for all input except speech lines.
IN% -General-purpose input value. Equal to INT (VAL (IN$)).
TL -Total number of lines in the speech currently being processed.
TL$ -Text Lines array having a total of TL elements in use.
ML -Maximum number of lines permitted; dimension of TL$.
MB$ -Speech line to be spoken. Required by the algorithm.
LN -Current line number.
L1 -First line of a group to be spoken, inserted or deleted.
L2 -Last line of a group to be spoken or deleted.
IL -Quantity of lines to be inserted.
DL -Quantity of lines to be deleted.
VT -Cursor VTAB position at start of line being edited.
SL% -Low-order byte of pointer to most recent "permanent" string.
SH% -High-order byte of pointer to most recent "permanent" string.
LO% -Low-order byte of pointer to D$ ("Clean Slate" condition).
HO% -High-order byte ("Clean Slate").

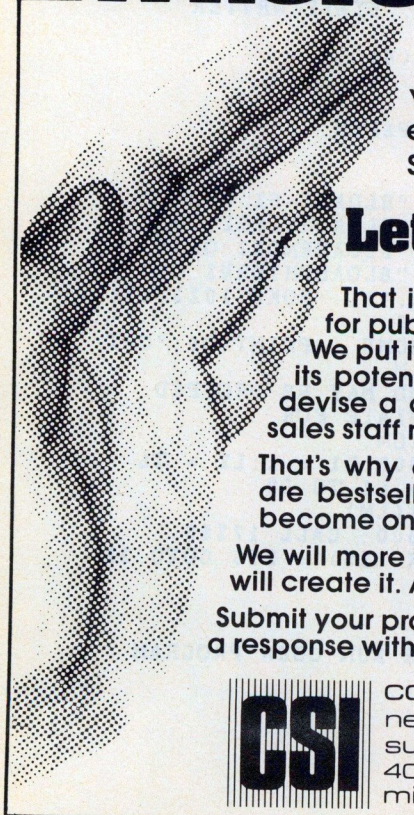
```
LOAD TEXT FROM DISK

4000 N$ = "GREETINGS"
4030  IF  LEFT$ (N$,5) <  > "MOCK
      " THEN N$ = "MOCK." + N$
4040  PRINT D$;"OPEN";N$
4050  PRINT D$;"READ";N$
4070  INPUT TL
4075  DIM TL$(TL)
4080  FOR LN = 1 TO TL
4090  INPUT TL$(LN)
4100  NEXT
4110  PRINT D$;"CLOSE": RETURN
```

```
HELLO THERE. THIS IS THE MOCKEENBORD TEX
T TO SPEECH ALGORITHM DISK.
TO SIMPLY HEAR WORDS SPOKEN AS THEY ARE
TYPED. USE THE TEXT TO SPEECH PROGRAM.
IF YOU WANT TO COMPOSE SPEECHES. USE THE
 SPEECH WRITER PROGRAM.
TO ALTER THE PRONUNCIATION RULES. USE TH
E PROGRAM P R E 2. BUT BE CARE FUL.
RIGHT NOW YOU ARE LISSNING  TO THE HELLO
 PROGRAM. IT WILL GREET YOU WITH ANY SPE
ECH YOU SAVE UNDER THE NAME OF GREETINGS

NOW YOU MAY TAKE CONTROLE. HAVE FUN.
```


Where's the Applause?



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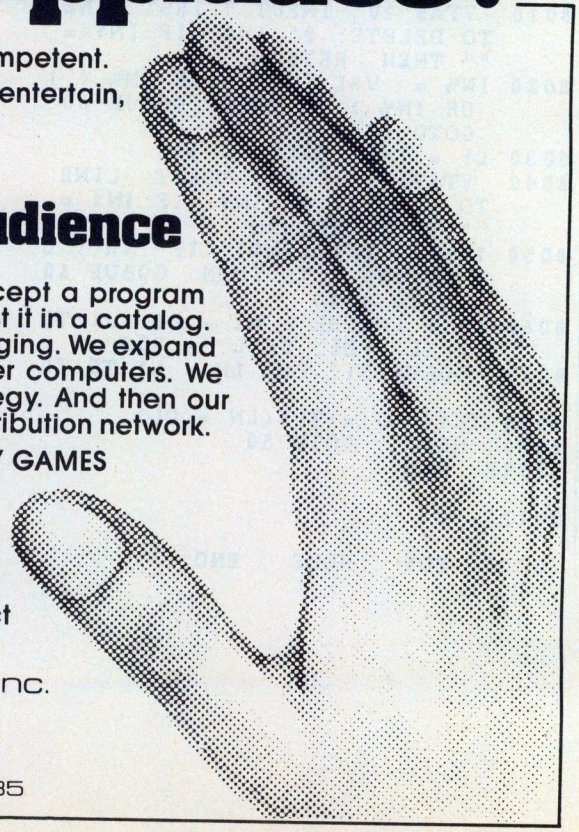

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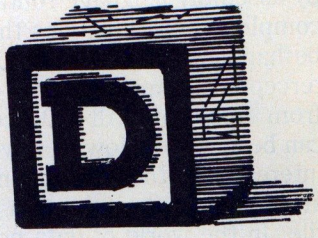
D IS FOR DATA:

Storage Access



Ken Kashmarek/Call —A.P.P.L.E. staff writer

IN part 1 of "D Is For Data," we touched on Personal Finance Manager and PFM.DATAFILE. As you recall, PFM stores its data in a DOS allocated text file but uses binary data formats throughout the file. What PFM has done is to advance data handling beyond ASCII text files. The text file was chosen for its size, and the binary data format was chosen for space and data handling efficiency. Since the data storage technique does not match the file type, Applesoft programs are unable to process the file using the standard DOS functions for text files.

The data storage technique is important. Once data has been input from the keyboard and converted to Applesoft internal formats, it is kept that way to eliminate overhead. There is considerable overhead in DOS to fetch and store data on text files in ASCII characters. There is additional overhead in Applesoft to convert ASCII characters to and from binary formats. By eliminating this overhead, fewer disk revolutions are missed when reading and writing data sectors. Most, if not all data management and data base systems store data directly in the binary formats for the same reasons—improved processing efficiency and reduced space requirements.

Since the object is to process PFM.DATAFILE from Applesoft, an alternative technique must be developed in order to access the files. To accomplish this, we will turn to the DOS File Manager and the ampersand interface for our solution.

DOS 3.3 File Manager

First of all, the reference for most of this work is *Beneath Apple DOS* (Quality Software), without which I would not have been able to complete the task. This document is highly recommended. Any detailed questions are referred to Beneath Apple DOS for explanation.

—◉→

Call —A.P.P.L.E. QUICKIE

Ken Kashmarek

Dear Val,

Here is one for *Call -A.P.P.L.E.* Quickie. Did you know that "PRINT SPC(0)" generates the same result as "PRINT SPC(0);" or just plain "PRINT ;"? I discovered this while working on PROGRAM LISTING FORMATTER. Thus, any PRINT command which ends with SPC does not generate the carriage return; with or without the semicolon. Documentation states that the semicolon must follow the use of SPC (page 160, *Applesoft Programming Reference Manual,* product #A2L0006). The same holds true if 0 (zero) in the above example is replaced with a positive value.

```
]LIST

100  REM

APPLESOFT FILE COPY PROGRAM
    COPYRIGHT (C) 1983
     BY KEN KASHMAREK

CALL -A.P.P.L.E.  OCT. 1983

110  REM

WILL COPY TEXT, INTEGER, BINARY,
AND APPLESOFT FILES FROM ONE
DISK TO ANOTHER, OR TO THE SAME
DISK. FILE TYPE MUST BE SELECTED
AND OUTPUT FILE NAME MUST BE
DIFFERENT THAN INPUT FILE NAME
(MAY BE RENAMED LATER).

120  TEXT : HOME : HTAB 12: INVERSE
     : PRINT "FILE COPY PROGRAM":
      NORMAL : PRINT
130 HI =  PEEK (115) +  PEEK (116
    ) * 256
140 LO = 8 * 1024: REM BUFFER STA
    RT
150 MS =  INT (HI / 256) -  INT (
    LO / 256): REM SECTORS BUFFE
    RED IN MEMORY
160 BE = LO + MS * 256: REM BUFFE
    R END
170  IF MS = 0 THEN  PRINT "INSUF
    FICIENT MEMORY TO CONTINUE":
     END
180  HIMEM: LO: REM PROTECT THE B
    UFFERS
190  ONERR  GOTO 800
```

STORAGE ACCESS

The file manager may be invoked by assembly language routines to accomplish those functions that cannot be handled by the standard DOS intercepted commands via [Ctrl-D] from Applesoft. All DOS commands can be invoked. However, we are only interested in those commands which are necessary to process a disk data file. In the world of data processing, there are essentially two areas: file access and data handling.

The area of file access is limited to those commands that deal with data files — OPEN, CLOSE, READ, WRITE, POSITION, APPEND, DELETE, RENAME, LOCK, and UNLOCK. In the simplest case, OPEN is used find a file and set up buffers, READ or WRITE is used to tell DOS to take data from or put data into a buffer, and CLOSE is used to terminate processing and free the buffer.

The area of data handling minimally requires some action to take data from the buffer (BASIC INPUT) so that it can be used by a program, or putting the data into a buffer (BASIC PRINT) after it has been processed by a program. For PFM. DATAFILE, this topic of data handling will be deferred until after we have mastered the file access.

The minimal set of commands to provide file access functions is OPEN, CLOSE, READ, and WRITE. Since the data in PFM. DATAFILE is handled on a sector basis, the READ and WRITE routines will process sectors. The interface is fairly straight forward, and the details are discussed in the next section. Before looking at the programs, some general discussion about the new function is in order.

Files can be processed sequentially, from first to last record, or randomly by selecting any record. In this context, record and sector are the same. In either case, OPEN and CLOSE functions are the same. Using DOS intercepted commands, only text files can be opened. Using the file manager directly, any file type can be opened and allocated on disk. Thus, our assembly language interface will provide the ability to process any file type by passing a type parameter. Type will be checked against the file being opened to determine if there is a mismatch. In addition, we can control whether a new file is to be allocated when the file to be opened is not found. By direct use of the file manager, an Applesoft program can have complete control over the file type and allocation of new files. The standard parameters will be processed for slot, drive, and volume. In addition, an unlock flag is provided to automatically unlock a file that will be written to. The CLOSE function will also provide a lock function or delete function.

```
200 H = 18: PRINT "ENTER FILE TYP
    E: ";: FOR I = 1 TO 8: READ
    T,S$,T$: PRINT T;" - ";T$: IF
    I > 4 THEN H = 17
202 HTAB H: NEXT : RESTORE : PRINT
    : INPUT TYPE$
210 TYPE = 0: VTAB 3: CALL - 958
    : PRINT "FILE TYPE:";: FOR I
     = 1 TO 8: READ R$,S$,T$: IF
    R$ = TYPE$ OR S$ = TYPE$ THEN
    TYPE = VAL (R$): I = 8
220 NEXT : DATA 0,T,TEXT,1,I,INT
    EGER,2,A,APPLESOFT,4,B,BINAR
    Y,8,'S','S' TYPE,16,R,RELOCA
    TABLE,32,'A','A' TYPE,64,'B'
    ,'B' TYPE: RESTORE
230 PRINT T$;: HTAB 23: PRINT MS
    ;" SECTOR BUFFER": PRINT
240 PRINT "INPUT FILE NAME,SLOT,
    DRIVE": PRINT : INPUT FILE$,
    SLOT,DRIVE
250 VTAB 5: CALL - 958: HTAB 5:
     PRINT "INPUT: ";FILE$: HTAB
    6: PRINT "SLOT: ";SLOT: HTAB
    5: PRINT "DRIVE: ";DRIVE: PRINT

260 PRINT "OUTPUT FILE NAME,SLOT
    ,DRIVE": PRINT : INPUT OUTPU
    T$,OSLOT,ODRIVE
270 VTAB 9: CALL - 958: HTAB 4:
     PRINT "OUTPUT: ";OUTPUT$: HTAB
    6: PRINT "SLOT: ";OSLOT: HTAB
    5: PRINT "DRIVE: ";ODRIVE: PRINT

280 XI = 0:XO = 0: REM  SET OPEN
    FLAGS
290 SI = 0:SO = 0: REM SET SECTOR
     COUNTS
300 FI = 0:EOF = 0
310  POKE 34,12:SD = SLOT > 0 AND
    DRIVE > 0:DS = (SLOT = OSLOT
    ) AND (DRIVE = ODRIVE)
320  IF SD THEN  PRINT "PLACE INP
    UT DISKETTE IN SLOT "SLOT" D
    RIVE "DRIVE: PRINT
330  GOSUB 770
340  IF XI = 1 THEN  GOTO 380
345 VT =  PEEK (37)
350  ONERR  GOTO 840: REM OPEN IN
    PUT FILE
360  & OPEN(FILE$,TYPE,1,SLOT,DRI
    VE)
370  POKE 216,0:XI = 1
380 V = 5:H = 3:LABEL$ = "READING
    ": GOSUB 920
400 MEM = LO: ONERR  GOTO 450
410  FOR SEC = 0 TO MS - 1
420  &  READ (FILE$,SI,MEM)
425 V = 7:H = 20:LABEL$ =  STR$ (
    SI): GOSUB 915
430 SI = SI + 1:MEM = MEM + 256
440  NEXT SEC: GOTO 470
450  IF  PEEK (222) <  > 5 THEN  GOTO
    840
460 EOF = 1:V = 5:H = 3:LABEL$ =
    "< EOF >": GOSUB 920
470  POKE 216,0
480  IF EOF = 0 THEN V = 5:H = 3:
    LABEL$ = "  INPUT": GOSUB 92
    5
490  IF (FI = 0 OR DS) AND SD THEN
     PRINT "PLACE OUTPUT DISKETT
    E IN SLOT "OSLOT" DRIVE "ODR
    IVE: PRINT : GOSUB 770:FI =
    1
500  IF XO = 1 THEN  GOTO 540
510  ONERR  GOTO 860: REM OPEN OU
    TPUT FILE
520  & OPEN(OUTPUT$,TYPE,0,OSLOT,
    ODRIVE)
530  POKE 216,0:XO = 1
540  IF EOF = 1 AND SO = SI THEN
     GOTO 680
550 V = 9:H = 3:LABEL$ = "WRITING
    ": GOSUB 920
```

Once a file is opened, It may be read or written. By using direct file manager calls, the data sectors may be read into any location in memory or written out from any location in memory (avoid key system areas, such as the I/O page, $C000, page 0, or DOS itself). The I/O will be performed by relative sector number, beginning with sector #0. Once the file is opened, any sector may be read or written. Therefore, a file may be processed sequentially, by taking the sectors in order, or randomly, by choosing the sectors as needed. Data in a file may be updated by reading a specified sector, changing the data, and immediately writing the sector back to the file.

For &OPEN, if the file is already open, then BUFFER NOT AVAILABLE is issued (that is, a buffer for this file is already in use, possibly for some other reason). For &READ or &WRITE, if the file is not open, then the same message is issued indicating that an open buffer has not been found for the file. &READ and &WRITE will not automatically open the file. At END OF DATA (end of file), the file is *not* automatically closed. This must be done by the new &CLOSE routine.

Before the file manager is called, a DOS buffer is obtained, and the file manager parameter list is set up. The file manager return code is checked for error conditions. The DOS error handler is entered on all error conditions. If ONERR is active, control is routed to the users routine (location 222 contains the error code). The DOS error handler must be entered with DOS unhooked (CSWL/KSWL reset). Otherwise, DOS will intercept the message its own routine is putting out, and the register save area will be overlaid (including the stack pointer).

Some of the formerly automatic file access functions have been moved back to the Applesoft program. However, by using the file manager directly (via our ampersand routines), we now have the ability to handle any file type, control file allocation, and process the file randomly or sequentially. We can now take a closer look at the program and how to use the functions.

FILEIO UTILITY — &OPEN/CLOSE/READ/WRITE

The functions described so far will be provided by an assembly language program via the ampersand vector. In addition, the program will be loaded in memory between DOS and the DOS buffers. The program itself is called FILEIO and will be loaded by FILEIO LOADER. The loader routine will move the DOS buffers, set up the ampersand vector, reset HIMEM, and load FILEIO into memory between DOS and the buffers. FILEIO will be protected from being destroyed by FP and other commands or programs that move HIMEM. The FILEIO commands follow:

&OPEN(filename[,type,allocate, slot,drive,volume,unlock])

where:

FILENAME = a character variable containing the file name (1–30 characters in length)

TYPE = the file type (0 = text, 1 = integer, 2 = applesoft, 4 = binary, 8 = special, 16 = relocatable). Default is text file.

```
570 MEM = LO: ONERR  GOTO 630
580  FOR SEC = 0 TO MS - 1
590  & WRITE(OUTPUT$,SO,MEM)
595 V = 11:H = 20:LABEL$ =  STR$
    (SO): GOSUB 915
600 SO = SO + 1:MEM = MEM + 256
610  IF SO = SI THEN SEC = MS
620  NEXT SEC: GOTO 640
630  GOTO 860
640 V = 9:H = 3:LABEL$ = " OUTPUT
    ": GOSUB 925
650  POKE 216,0: IF EOF = 1 THEN
     GOTO 680
660  IF DS AND SD THEN  GOTO 320
670  GOTO 380
680  REM

END OF FILE, SO CLOSE DOWN

690  IF XI = 1 THEN  & CLOSE(FILE
    $)
700  IF XO = 1 THEN  & CLOSE(OUTP
    UT$)
710  PRINT SO;" SECTORS COPIED.":
     PRINT
720  INPUT "C TO CONTINUE, E TO E
    ND ";A$
730  IF A$ = "C" THEN  POKE 34,0:
     VTAB 3: CALL  - 958: GOTO 200
740  HIMEM: HI
750  TEXT : END
760  CALL  - 1059: PRINT "FUNCTIO
    N TERMINATED": GOTO 680
770  CALL  - 1059: PRINT "HIT RET
    URN KEY TO PROCEED";: GET A$
     : PRINT : PRINT :A =  ASC (A
    $): IF A = 3 OR A = 27 THEN
     POP : GOTO 760
780  IF A <  > 13 THEN  VTAB  PEEK
    (37): GOTO 770
790  RETURN
800  HIMEM: HI
810  IF  PEEK (222) > 253 THEN  CALL
     - 1059: PRINT "PROGRAM TERM
    INATED BY CTL-C OR": PRINT "
       INPUT ERROR": PRINT
820  TEXT : END
830  REM

DISK ERROR HANDLING ROUTINE

840  CALL  - 1059: POKE 216,0: PRINT
    "DOS ERROR ON INPUT DISKETTE
    , ONCODE="; PEEK (222)
845 V = 5:H = 3:LABEL$ = "  INPUT
    ": GOSUB 925
850  GOTO 870
860  CALL  - 1059: POKE 216,0: PRINT
    "DOS ERROR ON OUTPUT DISKETT
    E, ONCODE="; PEEK (222);
865 V = 9:H = 3:LABEL$ = " OUTPUT
    ": GOSUB 925
870 X = 43377 +  PEEK (43583 +  PEEK
    (222)): PRINT : HTAB 5: PRINT "--> ";
880 Y =  PEEK (X): PRINT  CHR$ (Y
    );:X = X + 1: IF Y < 128 THEN 880
890  PRINT : PRINT
900  GOTO 690
910  REM SOME SUBROUTINES
915  INVERSE : GOTO 930
920  FLASH : GOTO 930
925  NORMAL
930 VT =  PEEK (37): VTAB V: HTAB
    H: PRINT LABEL$;: NORMAL : VTAB
    VT + 1: HTAB 1: RETURN
```

ALLOCATE = 0 to allow allocation of a new file if an old file is not found, else 1 to suppress allocation if an existing file is not found (issues FILE NOT FOUND). Default is 1.

SLOT = slot number for file (default is current slot)

DRIVE = drive number (1 or 2, default is current drive)

VOLUME = volume number (default is 0 for no volume check)

UNLOCK = 1 to unlock the file (default is 0 to leave file as is)

&CLOSE(filename[,option])

FILENAME is the same as for &OPEN. OPTION=1 will delete the file and OPTION=2 will lock the file (default is 0 to take no action).

&READ(filename,sector,buffer)

FILENAME is the same as earlier indicated. SECTOR is an expression giving the sector number to be read from FILENAME. BUFFER is a variable giving the memory address where the data sector is to be placed. If BUFFER = 0, then the data is left in the DOS buffer, and the address of the DOS buffer is returned to the variable.

&WRITE(filename,sector,buffer)

FILENAME is the same as indicated earlier. SECTOR is an expression giving the sector number to be written to FILENAME. BUFFER is a variable giving the location in memory from which the data is taken to be placed on the file.

The assembly language program uses the command decode front end from PRINT USING & FRIENDS (In Depth #1, page 87). The program listing contains definitions for all Applesoft and DOS routines that are used. It is set up to be run on a 48K machine and assumes DOS located at $9D00. For &OPEN and &CLOSE, FILENAME is the only required parameter. All others are optional and may be omitted. Omitted parameters may be indicated by adjacent commas if one or more of the remaining parameters is used, i.e., &OPEN(F$,4, 1,,,,1) will open an existing binary file on the current slot and drive without any volume check and unlock the file.

All four routines use common code for finding a DOS buffer (FNDBUF) and invoking the DOS file manager (FMCALL). The file manager parameter list is set up each time a routine is invoked (unlike the DOS intercepted commands, where the parameter list is set up and left for several INPUT or PRINT commands). For &READ, the data length set in the parameter list is 256 ($100). For &WRITE, the data length set in the parameter list is 255 ($FF). It must be one less than the length of data written. File type is checked after the file is opened. To do this, DOS must be unhooked first. If a file type mismatch occurs, DOS routine CHKTYP will close the file, and exit to the error handler. If CHKTYP returns, the DOS is rehooked before returning to Applesoft. File type mismatch cannot occur when allocating a new file, unless the file already exists and is a different type. &CLOSE will free the DOS buffer after closing the file (store $00 in first byte of buffer file name field).

```
:ASM
                 ********************************
                 *                              *
                 * Applesoft file utility loader *
                 *      Copyright (c) 1983      *
                 *      by  Ken Kashmarek       *
                 *                              *
                 * Call -A.P.P.L.E. : Oct. 1983 *
                 *                              *
                 * The following address is the *
                 * start for FILEIO. It must be *
                 * changed if the load point is *
                 * different for some reason.   *
                 *                              *
                 ********************************

                 FILEIO   EQU  $985A       ;Program start

                 *
                 * Symbol definitions
                 *
                 INBUFF   EQU  $0200       ;Input buffer
                 AMPV     EQU  $03F5       ;Ampersand JMP
                 DOSTRT   EQU  $9D00       ;48k DOS start
                 BUFBLD   EQU  $A7D4       ;Buffer build
                 STACKS   EQU  $AA59       ;Stack save
                 COUT     EQU  $FDED       ;Print char
                 *
                 * ORG set to not overlay $300-too popular
                 *
                          ORG  $02B0

                 *
02B0: A9 34               LDA  #<FILEIO-38 ;First buf
02B2: 8D 00 9D            STA  DOSTRT
02B5: A9 98               LDA  #>FILEIO-38 ;Start adr
02B7: 8D 01 9D            STA  DOSTRT+1
02BA: 20 D4 A7            JSR  BUFBLD      ;Build buffers
02BD: AD 59 AA            LDA  STACKS      ;Keep stack
02C0: 48                  PHA
02C1: AD 00 02            LDA  INBUFF      ;Save char
02C4: 48                  PHA
```

Calls to &OPEN, &CLOSE, &READ, and &WRITE may be intermixed with standard DOS text file commands. Each routine saves and restores the DOS file manager parameter list (moved from $B5BB to location $BA69, an unused area in DOS). However, all possible circumstances have not been tested. There may be conditions under which this will not work. In particular, do not use &OPEN to a file followed by [Ctrl-D] READ (or WRITE) to that file. &OPEN may be used to open an existing text file, followed by &CLOSE, then followed by [Ctrl-D] OPEN. In this fashion, &OPEN can be used to test to see if the file exists, while at the same time setting slot, drive, and volume (at $AA6A, $AA68, and $AA66 respectively). &READ and &WRITE do not change the high order bit on data bytes for a text file. These routines are used for reading and writing sectors and not for data handling (part 3 of "D Is For Data" will cover this topic).

FILEIO LOADER is used to load FILEIO into memory between DOS and the buffers. Both routines must be entered, assembled, and saved before they can be used. The origin of FILEIO must match the address equate in FILEIO LOADER for this process to work correctly ($9A78). The version of FILEIO listed does not fill the gap between $9A78 and $9D00 (DOS start). This space will be used by data handling routines in part 3 of "D Is For Data." Now that our programs are in place, let's give FID a run for the money.

File Copy Program

FILE COPY PROGRAM is written in Applesoft and uses the ampersand functions just described to access any file type and copy it to the same or another disk. The output file must have a different name than the input file (it may be renamed later if it is copied to a different diskette). Input to the program is file type, name, slot, and drive of the input file, plus name, slot, and drive of the output file. Instructions are given when to insert and change diskettes. DOS error messages are issued when errors are encountered. The program uses all available memory for a sector buffer. Usually, about 110 sectors are available. Most files can be copied in one pass. Using FID, it takes five swaps of diskettes on one drive to copy PFM.DATAFILE. With COPY FILE PROGRAM, it takes only three swaps of the diskettes. The sectors are read and written fairly rapidly, especially text files. The number of copied data sectors is indicated (this does not include track sector list sectors, which are taken care of by DOS).

A special feature: if the file is being copied to the same diskette, the slot and drive can be specified as 0 for both the input file and the output file. In this case, copying proceeds without halting the program and giving instructions to swap diskettes.

Caution: do not attempt to use any of these routines the first time on any diskettes that you cannot afford to lose (even for input processing). A finger check somewhere in the assembly language routines or the Applesoft program could easily destroy data. I use this program on a regular basis for file copying, even to backup PFM.DATAFILE. However, I did not use it on live data until I was confident that it worked (all of the time). Test the programs out by copying a file and then using that file to see if the copy performed okay.

Tune In Again Next Month, Same Time, Same Place . . .

and we will bring you another installment of "D Is For Data." This month, we have extended Applesoft by making use of the DOS file manager via the ampersand vector. These functions bring file capabilities back to the BASIC program where they can be used, with every file type supported by DOS. With the file access function complete, we can now move to doing something with the data.

Our next installment will provide a set of general purpose data handling routines to fetch binary data from DOS buffers and make that data available for use by Applesoft programs. This also includes the capability to move data from Applesoft symbol table entries to DOS data buffers to be written on a file. And all of this WITHOUT PEEK, POKE, &PEEK, or &POKE. When that step is complete, we will then be able to process PFM.DATAFILE in all its splendor and glory.

```
02C5:  A0 00      42          LDY   #$00
02C7:  B9 EA 02   43  SNDCHR  LDA   BRUN,Y      ;Issue BRUN
02CA:  F0 06      44          BEQ   SNDEND
02CC:  20 ED FD   45          JSR   COUT        ;Send to DOS
02CF:  C8         46          INY               ; BLOAD
02D0:  D0 F5      47          BNE   SNDCHR      ; command
02D2:  68         48  SNDEND  PLA               ;DOS returns
02D3:  8D 00 02   49          STA   INBUFF      ;Restore char
02D6:  68         50          PLA
02D7:  8D 59 AA   51          STA   STACKS      ;Restore stack
02DA:  A9 4C      52          LDA   #$4C        ;JMP instr.
02DC:  8D F5 03   53          STA   AMPV
02DF:  A9 5A      54          LDA   #<FILEIO    ;FILEIO lo
02E1:  8D F6 03   55          STA   AMPV+1
02E4:  A9 98      56          LDA   #>FILEIO    ;FILEIO hi
02E6:  8D F7 03   57          STA   AMPV+2
02E9:  60         58          RTS               ;Return to DOS
02EA:  84         59  BRUN    HEX   84          ;Ctrl-D
02EB:  C2 CC CF
02EE:  C1 C4 A0
02F1:  C6 C9 CC
02F4:  C5 C9 CF   60          ASC   "BLOAD FILEIO"
02F7:  8D 00      61          HEX   8D00        ;Return,null

--End assembly--

73 bytes

Errors: 0
```

STORAGE ACCESS

Hex dump: FILEIO UTILITY

```
*985A.9B25

985A- A2 00 86 19 A0 00
9860- BD 8F 98 F0 1A C9 FF F0
9868- 08 D1 B8 D0 07 C8 E8 D0
9870- EF 4C C9 DE E8 BD 8F 98
9878- D0 FA E8 E6 19 D0 DF 20
9880- 98 D9 06 19 A6 19 BD A4
9888- 98 48 BD A3 98 48 60 4F
9890- 50 45 4E 00 43 4C 4F 53
9898- 45 00 87 00 57 52 49 54
98A0- 45 00 FF AA 98 38 99 AD
98A8- 99 F2 99 20 BB DE 20 67
98B0- 9A A2 00 20 55 9A 86 06
98B8- A2 01 20 55 9A 86 07 AE
98C0- 6A AA 20 55 9A 8A F0 07
98C8- C9 08 B0 68 8E 6A AA AE
98D0- 68 AA 20 55 9A 8A F0 07
98D8- C9 03 B0 58 8E 68 AA AE
98E0- 66 AA 20 55 9A 8E 66 AA
98E8- A2 00 20 55 9A 86 09 20
98F0- B8 DE 20 1E 9A B0 03 4C
98F8- 41 9A 20 3D 9A 20 1A A7
9900- A0 02 A9 00 91 FD C8 A9
9908- 01 91 FD A0 07 A5 06 91
9910- FD A6 07 F0 09 A6 09 F0
9918- 05 A9 08 20 96 9A A9 01
9920- A6 07 20 96 9A 20 E0 9E
9928- A5 06 20 C4 A7 20 51 A8
9930- 20 8B 9A 60 A0 02 4C A8
9938- 9A 20 BB DE 20 67 9A A2
9940- 00 20 55 9A 86 09 20 B8
9948- DE 20 1E 9A 90 05 20 3D
9950- 9A D0 03 20 4B 9A A0 03
9958- A9 00 91 FD 88 D0 FB A9
9960- 02 20 96 9A A6 09 F0 3D
9968- A0 0C B1 FD 85 50 C8 B1
9970- FD 85 51 A0 26 B1 50 4A
9978- 4A 4A 4A 48 C8 B1 50 48
9980- C8 B1 50 49 FF A0 04 91
9988- FD C8 68 91 FD C8 68 91
9990- FD E0 01 D0 07 A9 05 20
9998- 96 9A 90 09 E0 02 D0 05
99A0- A9 07 20 96 9A A0 00 98
99A8- 91 40 20 8B 9A 60 20 CA
99B0- 9A 20 1E 9A 90 03 4C 41
99B8- 9A 20 4B 9A 20 B1 9A C8
99C0- 91 FD C8 A9 01 91 FD A6
99C8- FB A5 FC D0 08 A0 10 B1
99D0- FD AA C8 B1 FD A0 09 91
99D8- FD 48 88 8A 91 FD A8 68
99E0- 20 E7 9A A6 06 A4 07 20
99E8- 2B EB A9 03 20 96 9A 20
99F0- 8B 9A 60 20 CA 9A 20 1E
99F8- 9A B0 46 20 4B 9A 20 B1
9A00- 9A C8 A9 FF 91 FD C8 A9
9A08- 00 91 FD C8 A5 FB 91 FD
9A10- C8 A5 FC 91 FD A9 04 20
9A18- 96 9A 20 8B 9A 60 20 DC
9A20- 03 84 FD 85 FE 20 95 A0
9A28- 20 80 9A A4 19 88 30 09
9A30- B1 1A 09 80 99 75 AA D0
9A38- F4 20 64 A7 60 A5 45 D0
9A40- 04 A0 0C D0 63 85 41 A5
9A48- 44 85 40 20 43 A7 20 4E
9A50- A7 20 2C A7 60 20 B7 00
9A58- C9 29 F0 0A 20 BE DE C9
9A60- 2C F0 03 20 F8 E6 60 20
9A68- E3 DF 20 6C DD A0 02 B1
9A70- 83 99 19 00 88 10 F8 C9
9A78- 1F 90 04 A9 1E 85 19 60
9A80- A0 13 B1 FD 99 69 BA 88
9A88- 10 F8 60 A0 13 B9 69 BA
9A90- 91 FD 88 10 F8 60 A0 00
9A98- 91 FD 20 DC 03 20 D6 03
9AA0- B0 01 60 A0 0A B1 FD A8
9AA8- 68 68 20 E0 9E 98 4C D2
9AB0- A6 A0 01 A9 04 91 FD C8
9AB8- A5 1C 91 FD C8 A5 1D 91
9AC0- FD C8 A9 00 91 FD C8 91
9AC8- FD 60 20 BB DE 20 67 9A
9AD0- 20 BE DE 20 67 DD 20 52
9AD8- E7 84 1C 85 1D 20 BE DE
9AE0- 20 06 9B 20 B8 DE 60 20
9AE8- F2 9A A6 06 A4 07 20 2B
9AF0- EB 60 20 F2 E2 A5 A2 10
9AF8- 07 A0 9B A9 01 20 BE E7
9B00- 60 91 00 00 00 00 20 E3
9B08- DF 85 06 84 07 20 6A DD
9B10- A6 12 30 0E 20 F9 EA 20
9B18- 52 E7 84 FB 85 FC 20 B7
9B20- 00 60 4C 76 DD DD
```

The Big Mac assembler source file for FILEIO UTILITY is available on anthology diskette 10-B. (members only)

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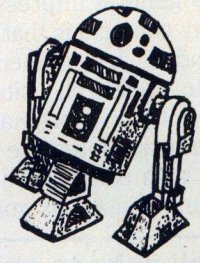

Jonathan Post/contributing editor

IN this issue of *Call -A.P.P.L.E.*, we have Part II of a three-part article — *Computer Futures*. Last issue we began this excerpt from an interactive book-in-progress. We had a preface, an introductionary section "The Age of Silicon," and an outline of six topics:

- Artifical Intelligence
- Robotics ✓
- Computer Graphics ✓
- Personal Computers ✓
- Exotic Technologies
- The Far-Out Future

In this portion of *Computer Futures* we will cover the topics check-marked above — Robotics, Computer Graphics, and Personal Computers.

In the next article, to appear in the next issue of *Call -A.P.P.L.E.*, we will explore the topics of Exotic Technologies and The Far-Out Future. Next issue's segment will also include a menu. The choices expressed by you, the readers, through letters to the editor, A.P.P.L.E. Crate, and other inputs, will help to determine what topics you would like to see expanded upon in *Computer Futures* — and you will see the results of your input in future issues of *Call -A.P.P.L.E.*

Now, let's get into "Robotics." The word "Robot," by the way, was adapted from slavic roots by the Czech playwrite Karl Capek, on the advice of his brother, for his visionary science fiction play *R.U.R.* (Rossum's Universal Robots).

Let's roll!

2. Robotics

The word "robotics" was invented by Isaac Asimov, and for many years the word conjured science fictional visions of gleaming humanoid automata striding past awed crowds of obsolete humans. Thirty-odd years later, the subject of Robotics is taught in graduate schools around the world. But robots have not turned out to be the smooth, metal giants of pulp magazine covers. Today's robots look more like golf-carts or drill-presses, they could never (even in a dim light) be confused with a human being.

Robots may be found in the dirtiest of industrial environments. . .

Robots are not found on the sidewalks of luminescent cities, or as waiters in exclusive restaurants, or at the helm of spaceships. Robots may be found in the dirtiest of industrial environments, where they weld, solder, assemble, spraypaint, and drill amid the sparks and chemical fumes that people shun. But already this is changing. Robots are beginning to proliferate in the workshops and garages of hobbyists and tinkerers. Perhaps the robot waiters are not so far away, and that would be a bonus to us all. . . because a robot never needs a tip to serve you courteously.

According to the Robot Institute of America, a robot is: a reprogrammable, multifunctional manipulator designed to move material, parts, tools, or specialized devices through variable programmed motions for the performance of a variety of tasks. Four levels of robotic development may be summarized as follows:

1) "Dumb Robots" with little or no sensory capability. This category includes the new spectrum of personal computer robots, which cost as little per arm as, say, a line printer.
2) Programmable robots with modest sensory capability, such as the Cincinnati Milacron CONCITE which has a simple optical sensor, or robots with touch/no touch pressure sensors.
3) Robots with a wider range of sensory and manipulative ability, such as the General Electric PRAGMA A-3000 (with two independent arms) or Dr. Thomas William's (a friend of mine from UMass, now head of robotics at DEC) robot with high-resolution touch sensors which can feel distinctions in shape.
4) Future robots with advanced sensors, manipulators, and "intelligent" behavior. These devices, which integrate AI and robotics, are exemplified by JPL's prototype Mars Rover (a project I worked on in its early phase) which can traverse hundreds of kilometers without human intervention.

There are also a great variety of robot languages. . .

There are also a great variety of robot languages — almost as many as there are types of robots. Fifteen of them are worth mentioning by name: AL, AML, Anorad, Autopass, Emily, Funky, Help, Maple, MPL, PAL, RCL, RPL, Sigla, T3, and one which should sound especially familiar to readers of *Call -A.P.P.L.E.* — VAL.

ROBOTICS TO GRAPHICS

The general impression I receive from my contacts is that the relatively independent development of robots at separate research sites is being replaced by a coordinated effort to synthesize and integrate existing techniques, with possibilities of standardization and consensus goal–setting.

Not all robots are as cute as R2D2 . . .

Not all robots are as cute as R2D2 or C3PO. Some are as deadly as U–235. The wider definition of robots admits automated missiles and spacecraft. So cruise missiles and the Viking Mars Lander reveal the robot as a potent force for military power, and for the expansion of mankind into the cosmos.

. . . by the 1990's robotic "advanced cruise missiles will be needed to attack targets worldwide."

Dr. Robert Cooper, director of the Defense Advanced Research Projects Agency, the top Pentagon agency for research, says (Independent Press Service, 26 March 1983) that by the early 1990's robotic "advanced cruise missiles or advanced undersea vehicles" will be needed to attack targets worldwide. He said that the advanced robots will draw on "human experience and expertise" stored in computerized knowledge banks and be able to react "much as a human does." Cooper envisions fighters and bombers with computers that think so fast that they can take over the pilots' normal functions, interpret radar and assess both "optical and electronic intelligence" to maneuver the plane or to shoot down planes and missiles.

Editors note:
Readers interested in constructing their own robots may wish to follow the adventures of Mike Thyng as he "rolls his own." Check your back issues for his "Robotics Series."

3. Computer Graphics: What You've Never Seen Before Is What You Get

The computer is a more powerful extension of the eye than is the telescope and microscope combined. Optical instrumentation, since the days of Leewenhoek and Galileo, has revealed wonders of nature too small, too distant and too faint for direct perception. But the computer can show us, on the color screen, sights never found in nature. The computer is, in the words of Theodor Nelson, a "Dream Machine" that opens a window into fantasy and speculation.

Computer graphics have already redefined the nature of art.

Computer graphics have already redefined the nature of art. John Whitney, father of computer movies, explains how the old has fallen by the wayside. "The new composer, and the visual artist who may aspire to deal with teleonomic structures, could as well be the child of some early dark age. The 20th century began with technology and has reaped a whirlwind of cultural dislocations and amnesia. Materials and forms and attitudes are so altered that past traditions are generally moribund."

Ken Knowlton, the leading computer artist of Bell Labs, says that computers don't just present the symbols of art in a newer medium: "Not only are the symbols new and ambiguous as with other art; they seem, still at this stage, to be new *kinds* of symbols . . . They may in themselves *be* a new experience."

the computer . . . can fill the artistic experiences with new life.

Interdisciplinary scientist I.J. Good agrees, explaining that the computer, far from making art a lifeless technology, can fill the artistic experiences with new life. "In both the visual arts and in music, expectations are built up by means of patterns and repetitions and there are many surprises which break up the monotony and instill life into the study." The computer can be programmed to surprise. In the drive–through "Cybernetic Landscape" of Aaron Marcus, a computer artist at Princeton University, you steer through an imaginary town as if driving a car, and the computer screen becomes your windshield. Each time you turn a corner, there is a new street before you, filled with new houses. An even greater surprise results when the car is swept into a tornado of words. *Somehow, Toto, I don't think that we're in Princeton anymore.*

Theories come and go, but a practical test reveals the truth behind these ponderings. A.M. Noll revealed in the respected Psychological Record (Jan '66) a surprising experiment, in a paper entitled "Human or machine — a subjective comparison of Piet Mondrian's 'Composition with Lines 1917' and a computer–generated picture." Hundreds of people were shown reproductions of both the painting by the famous modernist and the painting produced by a computer program. A clear majority, 59%, preferred the computer art. More astonishing to those who attack computer art as sterile bit–twiddling, only 28% could correctly identify the Mondrian. Computer art has come — and it has come in conquering.

In the spring of 1983, between the mudslides and sunshine of Southern California, a Cray X–MP/22 computer was delivered to John Whitney, Jr. and Gary Demos. This supercomputer, the largest for sales anywhere in the world, was designed to handle the most intricate problems of nuclear fusion simulation, radar signal analysis, and the weapon systems design requirements of Los Alamos.

. . . the Cray X-MP/22 computer will be the most dazzling generator of special effects in Hollywood

And yet this number–cruncher, which can rip through calculations at a rate exceeding one billion every second, has a more astounding function. It will be the most dazzling generator of special effects in Hollywood. Because these two geniuses of computer graphics, who have shown their handywork in TRON and STAR TREK II, believe that they can create artificial scenes so lifelike that filmgoers across the land will not be able to tell where the background stops and the bits begin. How did the wizards of Hollywood lay their hands on the largest computer in California history? And what kind of super–graphics can a super–computer paint?

The answer shows us how the Silver Screen and the Computer Screen may evolve together into the dominant artform of the 21st century.

The Cray X-MP/22 costs 12.6 million, and will be installed at Digital Productions in time to produce footage for the Lorimar film "Starfighters"...

(Among people I intend to interview are: Gary Demos, who used to jam with me at Caltech, John Whitney, Jr. — I worked with his father, who had been making movies in the 40s from breadboarded analog computers; and Theodor Nelson, underground king of graphics, also known for writing the first rock opera, in 1957, along with David Baltimore, who now has a Nobel prize for discovering reverse transcriptase — which gets information from RNA to DNA instead of the usual reverse; and Tom DeFanti, the current president of SIG-GRAPH, the Association of Computing Machinery's Special Interest Group in Graphics, who spent considerable time with me escaping a dull conference in not-so-dull Acapulco.)

4. Personal Computers: Convivial Computers from Cradle to Grave

Now that personal computers have come into our homes as honored guests, they will never leave. Already they have changed the ground-rules of society, altering the balance of power between children and parents. Many a business person is locked in conference with his/her ten-year-old, begging the youngster for the clues to spreadsheet analysis and automated tax returns. The personal computer is clearly more than the ultimate toy. It puts power in the hands of youth.

The personal computer is clearly more than the ultimate toy

Already I have had the strange experience of overhearing one pre-pubescent tell another, at the keyboard, "anyone over 15 is out of it." Suddenly, for all my 17 years of computer literacy, I felt like an antique.

The day may come when computers in the crib have more influence than dull and distant adults, and computers in the womb prepare the embryo for life in the computer age. The day may come when graveyards become rows of read-out terminals, and grieving survivors, before they leave their flowers, ask the simulations of the departed for advice on the problems on this side of the hereafter. Computers might be with us from the cradle to the grave — and beyond.

Before this can come to pass, computers must evolve beyond the personal. Computers must become really personal — intimate, convivial, and friendly. The voice of the computer must be able to whisper sweet nothings in our ears, and the voice-recognizing ears of the computers must learn to sense the secrets in our tone of voice. A number of experts, in this chapter, share their visions of the very, very personal computer. Jim Baen, Richard Purtill, Dean Ing, Ray Sperber, and Ctein invite you to hang out with the machines.

Computers Could "Boost" the Brain

(Seattle Times, 14 Sep 82)

"Just as hearing aids help the partially deaf perceive sounds, 'thinking aids' may one day help the human brain extend its ability to process and remember information, predicts a report by the American Council of Life Insurance.

"If current trends persist, predicts the report, tiny computers implanted under the scalp and capable of speaking the electrochemical language of the human brain could be available within 50 years.

"While the technology for 'brain boosting' likely will be available, it may go un-implemented, the study speculates, because people may suffer 'information sickness' and be unwilling to inundate themselves with still more data."

Other topics: a preview of next issue's menu

How the personal computer boom began with the Intel 8080 chip in 1975, and how I came to have three personal computers back in the dim dark days of the mid 1970's.

Why did the first few personal computer companies, such as Processor Technology with its wood-panelled Sol, all disappear?

How it feels to have your personal computer literally go up in smoke.

How I had a chance to buy stock from Nolan Bushnell after being one of the first people to test "Pong" — for a little outfit he was going to name "Atari" — and why I refused my chance to be a multimillionaire.

Why, if a concert pianist can strike 13 keys per second, while the fastest typists can only hit 11 keys per second, the computer terminal looks like a typewriter and not a piano.

Why are adventure-type games more responsive than most business software?

When Alan Schoener (Art in America, Mar/Apr '66) predicted "citizen artists" whose interactive computer aesthetic experiences will fill up most of our future leisure time...did he expect the videogame to prove him right? Are videogames aesthetic? Why are adventure-type games more responsive than most business software?

What is the secret behind the explosive growth of personal computer networks? Will we become a "Network Nation"? Or will Japan and France beat us to the punch?

What is the untold story of the elusive Mr. Wachsman, inventor of the sexually-stimulating strap-on body-speaker? Does the programmable dildo have a future outside the Masters & Johnson sex laboratory? And how is robotic sex experienced today?

This ends our discussion of the topics, Robotics, Computer Graphics, and Personal Computers. We've ended with a preview of the menu of topics which may be covered later. In the third article of *Computer Futures,* in your next issue of *Call -A.P.P.L.E.,* we will summarize what has been covered so far, and then jump into a survey of Exotic Technologies and the Far-Out Future. We will then present our menu — so keep a backup copy of your notes or items you'd like to learn more about.

We'll share in the interactive future in the next issue — see you then!

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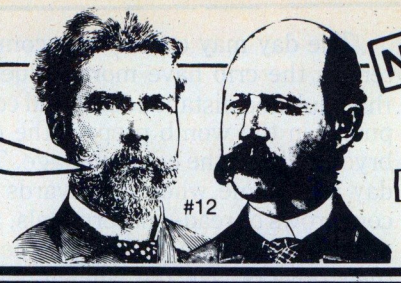
(Don't Settle for Less!)



*APPLE is a Registered Trade Mark of You-Know-Who.

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by BERT KERSEY

SHAPE EDITOR: Keyboard-draw shapes for animation in your programs. Create **Proportionally-Spaced Typefaces** with special characters. Six fonts included. Listable Applesoft demos show you how to animate graphics and create professional Charts and Graphs.

BYTE-ZAP: Rewrite any byte on a disk for repair or alteration. Load entire sectors on the screen for inspection. **Hex/Dec/Ascii** displays and input. Educational instructions include experiments for making trick file names, restoring deleted files, changing DOS, etc.

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26 NEW FONTS for use with Apple Mechanic programs. Many sizes of fully-editable characters.

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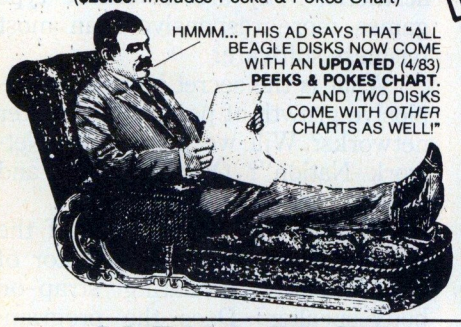
(**$20.00**: Includes Peeks & Pokes Chart)



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RENAME DOS COMMANDS and Error Messages. "Catalog" can be "Cat"; "Syntax Error" can be "Oops" or *anything*. **Protect your programs**—An unauthorized Save-attempt can produce a "Not Copyable" message, or *any* message you want. Also List-Prevention and one-key program-execution from catalog.

Customize DOS. Change the Disk Volume heading to your message or title. Omit or alter catalog file codes. Fascinating documentation, tips and experiments.

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New!

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HIGH-SPEED DOS / DOS-MOVE UTILITY
by TOM WEISHAAR

Put HIGH-SPEED DOS in your Apple's normal memory, Language Card or Apple IIe's high-memory—

Function	Normal	Pronto
BLOAD HI-RES IMAGE	10 sec.	3 sec.
LOAD 60-SECTOR PROGRAM	16 sec.	4 sec.
SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.
BLOAD LANGUAGE CARD	13 sec.	4 sec.

(Text Files: No Change)

Boot the Pronto disk or your updated disks, created with the normal INIT command. Compatible with ALL DOS Commands, GPLE® and most of your programs.

Move DOS to your Language Card or Apple IIe standard high-memory, freeing up **10,000** Extra Bytes!

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20/40/56/70-COLUMNS WITHOUT HARDWARE
by MARK SIMONSEN

PRINT VARIABLE-WIDTH TEXT on both hi-res screens with normal Applesoft commands (including Htab 1-70). Normal, expanded & compressed text with no hardware. 70-columns requires b/w monitor (not tv).

Add Graphics to Text or Text to Graphics. Run your existing Applesoft programs under Flex Text control. Fast, easy to use and Compatible with GPLE.®

DOS Tool Kit® font compatibility, or use the supplied Flex Text typefaces. Select up to 9 fonts with control-key commands. Custom text character editor included.

(**$29.50**: Includes Peeks & Pokes Chart)

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HIGH-SPEED PRESENTATION UTILITY
BY TOM WEISHAAR

MAKE PROFESSIONAL PRESENTATIONS of existing hi-res, lo-res and text frames. *FAST* hi-res loads in 2½-seconds! Paddle or Keyboard-advance frames.

Unattended Shows are optional with each picture arranged and pre-programmed to display from 1 to 99 seconds. **Text Screen Editor** lets you create black-and-white text "slides" and add type "live" from the keyboard during shows. Mail copies of presentations on disk to friends and associates (or home to Mom!).

(**$29.50**: Includes Peeks & Pokes Chart)

New!

BEAGLE BASIC

APPLESOFT ENHANCER by MARK SIMONSEN

Requires Apple IIe (*or* II/II+ with RAM Card)

RENAME ANY APPLESOFT COMMAND or Error Message to any word, for program clarification or encryption. Plus add optional NEW COMMANDS—

ELSE follows If-Then's (as in IF X=2 THEN PRINT "Yes": *ELSE* PRINT "No"). **SWAP X,Y** exchanges 2 variables' values. Use **TONE** command to write music with no messy pokes & calls. **HSCRN** reads the color (off/on) of any hi-res dot. **SCRL** scrolls the text screen in *either* direction. **TXT2** lets Text Page 2 act like Page 1.

Also— GOTO or GOSUB may precede variables (as in "GOSUB FIX" or "GOTO 4+X". Escape-mode indicated by special ESC CURSOR. Replace Apple's awkward Graphics Screen Switch pokes with one-word commands. Change ctrl-G Beep to any tone. INVERSE REM STATEMENTS too! All GPLE® compatible.

These new functions occupy ZERO extra memory!

(**$34.95**: Includes Peeks/Pokes Chart & Tip Book #6)

BEAGLE BAG

12 APPLE GAMES by BERT KERSEY

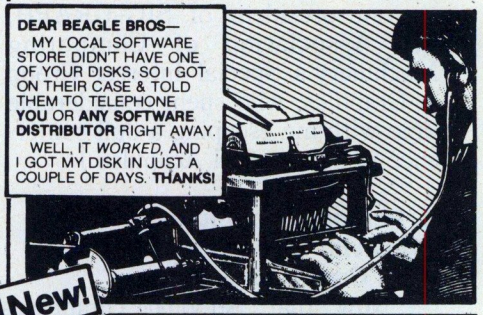
COMPARE BEAGLE BAG with any single-game locked-up disk on the market today. All 12 games are a blast, the price is right, the instructions are crystal clear, *and* the disk is COPYABLE. You can even *change* the programs or list them to learn by seeing how they work.

Twelve Games from the Applesoft Ace, Bert Kersey—TextTrain, Wowzo, Buzzword, Magic Pack & more...

Excellent Reviews— (see Jan-83 *Softalk*, page 148).

BEAGLE MENU too: Description under "Typefaces".

(**$29.50**: Includes Peeks & Pokes Chart)



New!

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LISTINGS & CATALOGS SCROLL Up *AND* Down, making file names and program lines much easier to access. Arrow-keys control scroll direction. New Applesoft LIST FORMAT: each program statement on new line for *FAST* program tracing and de-bugging.

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Circle 2 on Reader Service Card

AN APPLE FOR THE TEACHER

Kathryn Hallgrimson Suther

In this issue

WE have a number of articles in our educational section which may be of interest to you. Perhaps you read the reviews last month on the two grade book programs. Jeffrey Jacques gives us an alternative. He points out a trap many of us fall into, buying a separate product for each task we need performed. If you own A.P.P.L.E.'s THE Spreadsheet, Jeffrey will show you how to use it for your classroom grade management needs.

Our Northern Spy columnist, Rick Sutcliffe, takes off his spyglass long enough to give educators some first hand insights into computer education in the schools. There are a number of problems districts face when trying to implement a new program. We're sure you will find Rick's experiences of interest and possibly some of his advice may help you to solve similar situations.

Are you looking for programs you can use with your primary school children, programs you do not need to pay for but can type in yourself and use? Then take the time to enter the listing accompanying *The Big Adding Machine.* Your children will find this a fun way to practice their addition with the numbers zero to nine.

Perhaps you are planning a trip to Mexico this fall or winter. Your computer and tape recorder can help you learn enough Spanish to travel with ease. We suggest you read the review by Helen Hamerstrom — *Spanish For The Traveler.*

Teacher Talks Back

Dewey Dykstra, an assistant professor at Boise State University, wrote in sharing comments inspired by Al Gruber's article *From LISP to Logo.* (August issue) We felt perhaps our readers would find his comments of interest.

Mr. Dykstra's comments are as follows:

1) *We find Logo, as Mr. Gruber has, to be a complete high level language. Using print statements to put a lot of text on the screen seems to slow things down and consumes a lot of space in memory.*
2) *The comment that the colon denotes a variable is not strictly true. The colon in front of a word indicates what's associated with the entity whose name is that word. In Logo the entity is a THING and what's associated with it is a value or a string (in Logo a WORD) or a list of WORDs, or a list of lists, or. . . In other words, the colon indicates the value of the THING. The quotation mark in front of a word indicates that we are talking about a THING, as opposed to a PROCEDURE. A word without punctuation in front of it is taken to be the name of a PROCEDURE by Logo.*
3) *Mr. Gruber seems to have missed his own points about naming procedures with descriptive names and the extendability of the language when he complains about long lists of procedures in the REPEAT and IF statements. We teach our students that all long lists of primitive procedures should be made into procedures with descriptive names and then to use those names in the top level procedures. This is done so that one can read the top level procedure and make sense of it, also the purpose of those lists of primitives is identified by the name. This should answer his complaint about the readability of Logo procedures. (Don't write them that way.)*
4) *While the above is not the same kind of documentation as we are used to, descriptive names do document the purposes of various procedures. Any more documentation than this should not take up space in electronic storage with the "program" itself, but should be put on paper or in a text file. Several reviewers in the popular magazines have missed these points and lamented the "lack" of documentation features.*
5) *I cannot overcome the speed objection except to say that the version of Logo that we use does not seem slow compared to BASIC.*
6) *On the data typing problem, often the use of descriptive procedure and variable names can help. With that and the fact that many primitives operate either on WORDS (and lists) or numbers can make things pretty unique in Logo procedures.*
7) *Since the whole spirit of Logo is to operate in an exploratory fashion, it seems that most documentation is in tutorial form and not in manual form. This spreads out the information and frustrates the attempts at "quick and dirty" skimming that we all are prone to try. This is not meant as an excuse for any poor documentation, but as a comment on documentation. Mr. Gruber is right that it is all there somewhere. I continually find important details when I seriously study sections that I had previously skimmed. Logo comes out of tradition of research in learning that suggests that learning is never "quick and dirty," contrary to the "lecture–memorize–regurgitate" mode that we learn in school. There are some good written materials on Logo: Abelson's book,* Logo for the Apple][, *the Abelson, di Sessa book that Gruber mentions, the book by Watts on Byte–McGraw–Hill, Lawson's book,* Discovering Logo *on Prentice–Hall.*

My last comment applies to all the articles listed above. Conspicuous by its absence is all mention of Terrapin Logo, the first one out for the Apple. The August 1982 Byte *article indicated that Terrapin's documentation was the best. Having had the opportunity to study Krell's and look at Apple's, our Computer College staff agrees with* Byte. *Terrapin has a substantial tutorial manual which deals with all the aspects of Logo, not just graphics as some of the others do; they back up their product with continual improvements and prompt, thorough responses to questions; they use binary files instead of text files (so does Krell); and their version of Logo gives one machine language access.*

A.P.P.L.E.'s New Educational Product

From surveys and contact with educators, we are aware of the popularity of both Logo and BASIC in our schools today. We recently produced a program we are proud of, *Turtlesoft,* something we feel educators should be exposed to.

education

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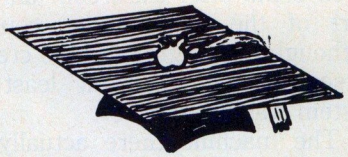
Circle 25 on Reader Service Card

An Apple for Nellie



Rick Sutcliffe/Call —A.P.P.L.E staff writer

"DOES it hurt, sir?" I had no idea what Nellie was talking about, so I looked over her shoulder to see what it was that she was reading. It turned out to be my letter from Kathryn Hallgrimson Suther over at *Call -A.P.P.L.E.* accepting my latest Northern Spy.

"I mean when she twists your arm like this." She was pointing to the section of the letter where Kathryn had asked (again!) for a submission to her educational column.

"Don't you think it is about time we got on with this? After all you promised it to her over a month ago, and you always claim to be such a fanatic about keeping your word."

"We?!" I expostulated, setting aside my lesser indignation at her prying through my mail.

"For sure. Listen. I'll ask you questions and you answer. Then I'll type up what you say and there will be your article. You always like to talk anyway," she added mischievously.

"Well, all right Nellie, but no technical stuff this time, mind — after all, this is for an educational column, not for hackers, like some of my other pieces. Where shall we start?"

"Why not at the beginning? How did our schools get the Apple computers in the first place, and how did you get involved?"

In the fall of 1979, S.D. #35 (Langley) had two computers. One large senior secondary had an old Hewlett-Packard running a batch process system with marked cards. They had paid $12,000 for the system, and it had sat idle for a full year when the original teacher left a year after its purchase.

Student interest was fairly high again, despite the fact that learning is very slow when all the input goes on cards which must be painstakingly marked with a special pencil. Then there is the long wait for any results to be processed. While of marginal utility for short units with younger students, this type of arrangement places severe limits on what can be accomplished, for students simply cannot write very long programs and hope to have them up and running by the end of a semester.

AN APPLE FOR THE TEACHER (Continued From Page 27)

Turtlesoft is written so people/children familiar with Logo can easily use it in conjunction with Logo or by itself. The commands Logo uses: FORWARD, BACK, RIGHT, LEFT, etc., are found in Turtlesoft along with identical abbreviations one may chose to use. Those who have not used Logo will find this program easy to sit down and immediately begin using its graphics capabilities.

Turtlesoft can also provide a smooth transition into BASIC. At this time, rather than a thorough examination of the fine attributes of this program, we shall simply mention a few of its features. Turtlesoft allows you to use Applesoft routines and learn BASIC programming habits. You use line numbers with Turtlesoft, just as you do with Applesoft. The use of quotes in Turtlesoft is similar to PRINT commands in Applesoft. Applesoft statements are also incorporated and could very well provide a means to learn and visualize the effects of these statements.

Each instruction in Turtlesoft has a name and must begin with an ampersand (&) and a quote. Some instructions require numbers or variables (to tell the turtle how far and in which direction to move). Let's look at a sample program contained within the text of the manual:

```
5   & "DRAW"
10   & "SQUARE"
20   END
100   TO "SQUARE"
110   FOR I = 1 TO 4
120   & "FORWARD"50
130   & "RIGHT"90
140   NEXT I
150   RETURN
```

You should be able to see both similiarities to Applesoft and Logo.

There are 15 demonstration programs included which display some of Turtlesoft's capabilities. Unlike many programs on the market, you can list out these programs and study them, a valuable educational tool. Turtlesoft also allows you to use both High-Res screens, incorporporate sound and variances of color.

At this point, we'll let you turn your attention to the articles contained in this column. Just keep Turtlesoft in mind, we're sure you will find this a valuable addition to your educational software collection.

education

AN APPLE FOR NELLIE

One other school, a junior secondary, had a single North Star computer and a very active club. They also offered some brief classroom units as part of the mathematics courses. Although the single machine created a severe bottleneck, at least the system was interactive.

The machine there actually belonged to the teacher, Gary Enns, though part of the financing had been arranged by the student council — otherwise there would have been nothing.

This would be a good time to mention the first rule for schools' just starting with microcomputers:

Rule #1

When you are getting started, take whatever you can get, and by all means be flexible. After the student interest has been demonstrated, you are in a much better bargaining position with the financing authorities. You also have a better idea what equipment you need and are less likely to waste money when you start slowly.

"But sir," Nellie interjected, "this is really ancient history. How about bringing things a little more up to date."

"Patience, Nellie, patience. We must set the scene before introducing the whole cast. Now, as I was saying..."

We (math teachers and others) had made several presentations to the school board asking for funding of computer science courses and their attendant hardware for all seven of the district's secondary schools, but these pleas had met with a deaf ear to this point. There had been a lot of criticism over the cost and idleness of the HP at the one school, and this had perhaps made trustees cautious. Also, there was little interest on the part of most of the district administrative staff, and without their enthusiasm, budget requests went nowhere.

Yours truly had nearly given up bashing his head against what seemed to be a brick wall by this time. It seemed that Langley was being surpassed by many other districts, some of which were smaller and not as well financed. They had people in power with vision and we apparently did not.

But about Christmas time that year, (how appropriate) I was approached by Harry Cullis — the Director of Instruction for the district — with the sad news that his discretionary budget was about five thousand dollars underspent. As those who had demonstrated an interest, would Gary and I, he wanted to know, be interested in spending it on two computers before the end of the year? If it could not be spent by then, he lamented, the money would revert to the provincial government.

Such a question! Suffice it to say that in a few days time, Gary and I each had an Apple computer in our schools to play with. Looking back, I realize that the director had instinctively known the content of:

Rule #2

Since people are surely more important than programs, place the initial machines with selected people; do not first devise curriculum and then decide on equipment. Make sure those teachers are already competent, busy and involved to the hilt with their students, because such are the ones who make the time to become expert enough to teach others. Give them the money and let them make the first decisions themselves.

Unfortunately Rule 2 has a corollary:

Rule 2a

Rule 2 cannot be enforced any longer than one or two years, while decision making is in the hands of a single person. Once a committee becomes involved, programs will take precedence over people, as they always do in a bureaucracy.

"But I thought that this was a people business. After all wasn't school supposed to be the place where our education got the highest priority?"

"Alas Nellie, you are talking about an ideal world. The real one that we all inhabit is dominated by the politics of power. The ones who have it want to exercise it, and the ones who do not spend much of their time lusting after it.

"Go to a school board or teachers' union meeting sometime. You will hear lots of fancy, rhetorical, and impassioned talk about the system, and how it ought to serve various interests, but you students hardly ever get a mention."

"That's a bit cynical isn't it sir? Mountain was a great school, and there were a lot of teachers there who really cared about their students. There weren't enough of the nine-to-three political types to ruin things, so we just ignored them."

"Hey, don't get me wrong, Nellie. I agree with you. But the people who make the most noise tend to obtain the power positions, and they seem often to be or to become much less interested in the students once they do this."

"So what is your solution?"

"Everybody in administration, from vice-principals on up to the government ministry officials, should teach at least one class a day during their term. After five years in their posts, they should be rotated back to a classroom for at least two more years before continuing in administration. Perhaps then they will not as easily forget who the system was intended to benefit."

"I know this is changing the subject, but we were talking about computers."

"Let's do..."

One month after getting the Apple (now into 1980) I knew enough about it to feel confident in starting our first Mountain Secondary Computer Club. Within two days there were thirty students clamoring to use the machines, and a strict schedule had been arranged. I held several noon hour sessions to give some initial instruction in the care and feeding of the computer, and to teach some rudimentary programming.

Once another two months had passed, I was also prepared to tackle the school principal for inclusion of an actual course on the next year's set of offerings. By this time, there was also a district computer committee preparing a budget submission for the current fiscal year. (The year had already started, but budgets are not approved until May.)

education

Getting the course approved was easy — there was already a rough outline in the provincial curriculum guide, and our principal was a former math teacher himself. He wanted the new technology taught in the school and was ready to back this up in his timetable. Other principals would soon follow with their schools. If they were not as keen as he, they at least did not want to fall behind. All were eventually persuaded, at least on a "me too" basis.

Obtaining money for more machines was another matter. After a great deal of arm twisting, the other members of the district administration were finally persuaded to accept a budget submission to the board for just under $15,000. Oh yes, and that was for the entire district, not just for one school! They actually passed it, for this was back in the days of plenty, and we had been to the trough more times than anyone else who asked for special funding that year. Perhaps they thought they would get rid of us by giving us a tenth of what we had been asking for.

The politics of each district are a little different. Surely there are few who are still at this initial stage of things, but those who are know well the frustrations of dealing with nickel and dime vision. It is a little easier now to get people to realize that we are in the midst of changes as profound as those which the industrial revolution brought, but three years ago few people would listen to such talk. Even fewer would take the risk of endorsing the capital requirements for putting talk into action.

As for us, the Mountain share of this money bought one more computer and a printer. In addition, we managed to generate enough funds within the school to purchase a third unit. We then were able to start our first ever computer science course in the fall of 1980 with twenty students (twenty more in the second semester) using three Apples with single drives and one printer.

The original decision to buy the Apple brand had been made on the basis of its reputation for reliability and versatility. To this day we have not regretted that decision, and I would still recommend it to those now beginning, despite the availability of lower cost (and quality) equipment.

There were no additional funds for second drives, or for software, books, or supplies, so of necessity, we used BASIC for that first year. Students learned the essential elements of the language, together with a little information on disk files and on the history and people of computing. A few of them were already producing some rather long and sophisticated programs by the end of their course.

Scarce resources must be carefully controlled however, and for both political and practical reasons, we implemented:

Rule #3

A) One day a week at noon was games day. Apart from that, no games were allowed on the computers at any time.

B) Rule A applied to teachers as well as students.

C) No student was to use a computer outside the hours of the supervising teacher. (In our case, from 7:00 to 5:00)

"That was pretty hard for some people to take, sir."

"Yes Nellie, but it was necessary. We had a lot of people trying to do their computer science course homework on those machines. If they had all been tied up with some ridiculous 'blast the aliens' thing, how could any work get done? Besides, can you imagine what would have happened to our funding if a school board member or a parent walked in on that kind of scene?"

"Tell them the reason for the five o'clock curfew."

"As if you of all people didn't know. The last straw was the second time I got a phone call at home from your mother at ten o'clock at night wanting to know where you were. After that, I never left the school without locking the computers safely in my room. Otherwise, I am sure some of you would have still been there in the morning."

"Things did get a little better though."

"Yes, Nellie, they did."

As time rolled on into 1981, we obtained one language system, and Nellie was amusing herself by learning Pascal on the side. With the course now a demonstrated success, the purse strings were somewhat looser, and a district budget of over $60,000 was approved for that year.

One other school which had capital available as part of a building expansion bought a class set of Pets to use in a locally developed course on word processing. They also improved their Apple lab at the same time.

Another problem had developed however. Already the school's mathematics department head, I was by this time also the scholarship counsellor, sponsor of several clubs (including graduation) and the school's only physics and computer science teacher. (These were in addition to several district and school committees.) The strain was beginning to tell.

I knew that we were entitled to another teacher for the following year and lobbied for someone to be added to my department. The boss seemed sympathetic, so I asked for either a computer science or physics teacher. Both were already scarce, but a former student of the boss turned up with a degree in computer science, good recommendations from his teacher supervisors and anxious to join our school. He still looked like a tenth grade student and was a little prone to newspeak in conversation, (like hey man, like, what's new man) but he was the best of the lot, so we hired him.

Now as I've said before, Chris Howerton is not only an Apple freak, but a Pascal maniac, so when it came time to spend our share of the current budget, it naturally had to go into adding more RAM cards and second disk drives. It also bought one more computer, and so did the music department, which wanted our talented man to do electronic music using his own synthesizer board. In addition, we bought a small hand operated card reader to assist with a brief introductory unit in eighth grade classes.

—◉→

education

AN APPLE FOR NELLIE

We now had five dual drive systems, and were ready for a room to be set aside, as my own office was no longer large enough to contain the equipment. The answer came in the form of a small area which was supposed to form part of the boiler room but which we had been using for learning assistance. The latter group were moved into a larger portable classroom, and after that summer Chris took over their space, just down the hall from my physics lab cum mathematics headquarters.

Now, speaking of summer, and other vacation times reminds me of:

Rule #4

During the breaks, send all the computers home with teachers or, failing that, with the more advanced students. This gets them out of the building during break-in time, and it also ensures that computer expertise is rapidly disseminated in the school community.

Of course, there's also:

Rule 4a

Like Rule 2, this one cannot be enforced once many people get into the act. All the empire builders in the district will want those machines for their own purposes, regardless of the superior benefits to your school of following Rule 4.

"Was that how Mr. M. got into writing that automatic English essay marker program?"

"Quite so, Nellie..."

About a month into Howerton's Pascal courses the next fall, maintenance arrived to install the electrical outlets in the room. (It had had only two; they needed a dozen.) At the same time, we taped aluminum foil on the windows to reflect back some of the intense heat coming across the large flat tar roof and through the unprotected glass.

That year, (81-82) we confirmed what I had already begun to suspect the previous year. Teaching Pascal, PILOT, or even BASIC to beginners is not ideal. Those who are destined to become programmers themselves will have little trouble no matter what language is used for introductory purposes, but the students who are interested only in a literacy course often cannot cope with the complexities and the intellectual demands of learning a language.

In addition, as Mountain was also by this time a centre for the international baccalaureate program, the best students tended to become tied up in their academic courses (except for Nellie, who took everything) and did not often elect computer science. The result was that many of those in the course tended to be weak in both computational ability and logical skills.

To overcome this, we formulated what I will call:

Rule #5

Rank beginners at the high school level should be taught the use of applications programs, such as word processing and spreadsheets, before being started on programming. This introduction should be a one semester (70 hour) course. The main programming course can be their second course and last a full year.

"But sir, I liked programming right from the start."

"As usual, you are the exception, Nellie. For most people, including those who actually sign up for a computer science course, using the thing is all they will ever be interested in doing. Programming takes its own special set of skills and inclinations, and it is not for everyone."

It was also our experience that Pascal itself made a more desirable first teaching language than did PILOT. I have not yet taught Pascal myself as a first language, but I now believe it to be superior to BASIC for beginners. I do note that structured BASIC is now becoming available and that the latest standards for this language would make it resemble Pascal more than anything else.

We carried on with this arrangement of courses for the following year as well, but increasing enrollment meant trying yet another location for the computers. This time we put them in the textiles room, which was seldom used anymore for that purpose, as few students take such courses these days.

By now, budget restraint was beginning to be felt with the recession, and our funds were reduced. Our school's share of the district money still bought two more dual disk systems and another printer — this time a Prism — to supplement our ageing Centronics. The sale of chocolate bars by interested computer club members provided enough money to buy an eighth machine. We also found unused funds in another budget to upgrade the card reader to an optical device, a much more reliable arrangement.

It is worth mentioning that nothing seems to bring out the worst in people who are already inclined to be nasty than the dividing up of money. The chief problems are inter-school jealousies and over cautious administrators. This is a good time to mention the rules for negotiation:

Rule #6

A) Send your coolest, best prepared, and thickest skinned negotiator to the budget meetings. These things are routinely characterized by interminable arguments, vigorous disagreements and betrayals of trust. Someone will get mad and stay mad — don't let it be your representative.

B) Under no circumstances agree to a division of the money solely on the basis of student population. Unless you are already at the stage where each school has a class set of computers, this will only guarantee that the students in the smaller schools will be treated as second class citizens, as they will get too small a share of the equipment to run any curriculum at all.

"We had far from a class set at Mountain, why are they getting nothing at all next year?"

education

"Two reasons, Nellie. It is time to apply the same principle to the secondary schools as a whole and start using what little money is being granted this year (back to $15,000) for the many small elementary schools. Second, the secondary teachers who started the ball rolling on this whole thing no longer control the committees, so they no longer spend the money.

"I do notice though that the ones involved now seem to feel that an elaborate and detailed curriculum needs to be in place before sending a machine to a school and they are spending most of their time on that aspect of things."

"But that violates rule number 2."

"Ah, but Nellie, dear heart, I am no longer involved in the rule making business, and I did tell you that rule 2 would not last. Why don't we just delegate the blame for stalling further progress to the recession and leave it at that."

"That must bring us up to the 82–83 school year then."

"Quite so, Nellie..."

Enrollment continued to grow in all the schools for this past year. By this time, I was into machine language and some of the students were producing some work which approached commercial quality. In fact our locally developed computer science 100 course had gained acceptance as equivalent to a university level introductory course, and some students were to get advance placement in this as well as in calculus.

Computers were obviously here to stay and a big success, but the recession had hit, and as I have said, there were to be no further funds available for the 83–84 school year. Indeed. it could be several years before any new equipment is purchased unless there are dramatic changes in funding priorities. I should note that British Columbia is far behind other provinces in this regard, and has provided little help or encouragement for local Schools to proceed.

There has also been some shuffling of personnel, with our friend Chris following his old teacher and our old boss to another school where total enrollment is high enough to justify a full time computer science teacher. The physics/computer science man from yet another school has transferred to Mountain to take his place.

On top of that, there will be a replacement for me as well, for as you know, I finally accepted an offer to teach at Trinity Western College (also in Langley) and my time in the public school system is now over after twelve years. The other new teacher will concentrate on mathematics and will be the new department head, though he has taught the other two subjects as well. For both of the two, there should be a much more realistic course load than what I was carrying in the last few years.

Despite the limited opportunities for expansion in the near future, the school is in a good position to carry on with an exciting and challenging set of course offerings for its students. It is particularly satisfying to me that in four years we have gone from no computers at all to some seventy in the district as a whole. Langley is now regarded as a leading district in microcomputer education in B.C. A few machines will be added this year in some elementary schools; these will likely be Commodores or clones — and I think you can guess what I think of that decision.

"So that's how it all happened, eh sir?"

"Yes, Nellie, that is the whole story — have you got it down for Kathryn?"

"Of course... but one more question before we wrap it up. What would you say are the greatest obstacles to overcome in getting started with microcomputers?"

"There are two. The first is lack of vision, particularly on the part of what I would call middle management types. They will go along with a crowd, but they will never get out on a limb on something that seems innovative for fear of impairing their career prospects. Had we people with vision ruling on our budget requests five to seven years ago, we would be much farther ahead today, and far more students would have received a 1980's education in our schools. Let's hope that the people reading this are better off in this regard.

"The second obstacle is tenure. Oh, and this is going to upset a lot of people. The fact of the matter is that educational job security has made the transfer of resources to the high-tech fields in those institutions difficult, if not impossible. We now have scores of tenured professors and teachers for whom there is not enough work to justify keeping on the public payroll and who are unable or unwilling to be retrained. Universities and public schools cannot respond to the rapid changes in student course demand by letting some of these people go and replacing them with the ones they need. When they are able to become more responsive to the needs of students in our rapidly changing society, there will be a lot more Apples (and a much more appropriate education) for a lot more Nellies."

"That's a heavy load to lay on your readers, sir."

"Oh, I'm just articulating a problem which I am sure they have all observed too, Nellie. The changes coming from the computer revolution will be felt in all facets of society, but nowhere will they hurt more than in education and other public services where people have become comfortable in systems which have not changed appreciably for decades.

"They are understandably frightened, and we should expect them to lash out in protest, but the survivors will change with the times and the students will be better off for it."

"You called this part one, sir. Will part two be about Trinity?"

"You bet, Nellie — but let's give them a month or two to digest this shall we?"

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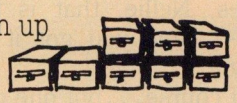
Duplicates on up to 8 drives!!! 

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Circle 1 on Reader Service Card

THE BIG ADDING MACHINE

Gary E. Leonard

HERE is a game to aid primary level students in adding sums from zero to nine. The object is to fill the machine's tank by getting ten correct answers in a row. Watch out!! One incorrect answer and the tank goes dry!

Should the young person press the letter "O" instead of zero, etc., a buzzer will indicate it is not acceptable. Happy Adding!!

Program Sections

Line(s)	Description
20–120	character subroutine
130–140	blinking subroutine
150	character clear subroutine
160	tank fill-up subroutine
170	incorrect key subroutine
180	tank empty subroutine
190–270	main body of program
280–290	reward routine (win)
300–310	machine language sound initialize
320–350	title page
360–460	instruction page
470–520	graphics screen initialize
530–550	graphics screen subroutines
560–570	replay routine

Variables

AA	3-D character color
A,B	color of blink
C	temporary color transfer
D,DD,Z	general purpose
L,M	random numbers (0–9)
N	input value
S	incorrect key sound
UP	tank fill
X,Y	character position
AA$,BB$,DD$,EE$,FF$,GG$,HH$	instruction strings
N$	input string
NU$	restart string
ST$	start string

```
]LIST

5  REM

   THE  BIG ADDING MACHINE
      BY GARY E LEONARD

CALL -A.P.P.L.E. : Oct. 1983

10  GOTO 300
20  VLIN Y,Y + 8 AT X + 2: COLOR=
     AA: VLIN Y,Y + 8 AT X + 1: RETURN

30  VLIN Y,Y + 1 AT X: VLIN Y,Y +
     4 AT X + 3: VLIN Y + 4,Y + 8
     AT X: HLIN X,X + 3 AT Y: HLIN
     X,X + 3 AT Y + 4: HLIN X,X +
     3 AT Y + 8: COLOR= AA: VLIN
     Y,Y + 1 AT X - 1: VLIN Y + 1
     ,Y + 3 AT X + 2: VLIN Y + 4,
     Y + 8 AT X - 1: RETURN
40  VLIN Y,Y + 8 AT X + 3: HLIN X
     ,X + 3 AT Y: HLIN X,X + 3 AT
     Y + 4: HLIN X,X + 3 AT Y + 8
     : COLOR= AA: VLIN Y + 1,Y +
     3 AT X + 2: VLIN Y + 5,Y + 7
     AT X + 2: PLOT X - 1,Y: PLOT
     X - 1,Y + 4: PLOT X - 1,Y +
     8: RETURN
50  VLIN Y,Y + 4 AT X: VLIN Y,Y +
     8 AT X + 3: HLIN X,X + 3 AT
     Y + 4: COLOR= AA: VLIN Y,Y +
     4 AT X - 1: VLIN Y,Y + 3 AT
     X + 2: VLIN Y + 5,Y + 8 AT X
     + 2: RETURN
60  VLIN Y,Y + 4 AT X: VLIN Y + 4
     ,Y + 8 AT X + 3: HLIN X,X +
     3 AT Y: HLIN X,X + 3 AT Y +
     4: HLIN X,X + 3 AT Y + 8: COLOR=
     AA: VLIN Y,Y + 4 AT X - 1: VLIN
     Y + 5,Y + 7 AT X + 2: PLOT X
     - 1,Y + 8: RETURN
70  VLIN Y,Y + 8 AT X: VLIN Y + 5
     ,Y + 8 AT X + 3: HLIN X,X +
     3 AT Y + 5: HLIN X,X + 3 AT
     Y + 8: COLOR= AA: VLIN Y,Y +
     8 AT X - 1: VLIN Y + 6,Y + 7
     AT X + 2: RETURN
80  VLIN Y,Y + 8 AT X + 3: HLIN X
     ,X + 3 AT Y: COLOR= AA: VLIN
     Y + 1,Y + 8 AT X + 2: PLOT X
     - 1,Y: RETURN
90  VLIN Y,Y + 8 AT X: VLIN Y,Y +
     8 AT X + 3: HLIN X,X + 3 AT
     Y: HLIN X,X + 3 AT Y + 4: HLIN
     X,X + 3 AT Y + 8: COLOR= AA:
     VLIN Y,Y + 8 AT X - 1: VLIN
     Y + 1,Y + 3 AT X + 2: VLIN Y
     + 5,Y + 7 AT X + 2: RETURN
100  VLIN Y,Y + 3 AT X: VLIN Y,Y +
     8 AT X + 3: HLIN X,X + 3 AT
     Y: HLIN X,X + 3 AT Y + 3: COLOR=
     AA: VLIN Y,Y + 3 AT X - 1: VLIN
     Y + 1,Y + 2 AT X + 2: VLIN Y
     + 4,Y + 8 AT X + 2: RETURN
110  VLIN Y,Y + 8 AT X: VLIN Y,Y +
     8 AT X + 3: HLIN X,X + 3 AT
     Y: HLIN X,X + 3 AT Y + 8: COLOR=
     AA: VLIN Y,Y + 8 AT X - 1: VLIN
     Y + 1,Y + 7 AT X + 2: RETURN
120  VLIN Y,Y + 1 AT X: VLIN Y +
     4,Y + 6 AT X: VLIN Y,Y + 4 AT
     X + 3: PLOT X,Y + 8: HLIN X,
     X + 3 AT Y: HLIN X,X + 3 AT
     Y + 4: COLOR= AA: VLIN Y,Y +
     1 AT X - 1: VLIN Y + 4,Y + 6
     AT X - 1: VLIN Y + 1,Y + 3 AT
     X + 2: PLOT X - 1,Y + 8: RETURN
130  FOR Y = 18 TO 24: COLOR= A: HLIN
     X + 1,X + 7 AT Y: COLOR= B: HLIN
     X + 1,X + 7 AT Y + 12: NEXT
     : CALL 774:C = B:B = A:A = C

140  COLOR= B: FOR Y = 18 TO 24: HLIN
     X + 1,X + 7 AT Y + 12: NEXT
     : CALL 774: RETURN
150 X = 1:Y = 1: GOSUB 540:X = 15
     : GOSUB 540:X = 29: GOSUB 54
     0: RETURN
```

education

THE BIG ADDING MACHINE

```
160  COLOR= 12: FOR D = 1 TO 2:UP
      = UP + 1: HLIN 14,22 AT 37 -
     UP: NEXT : RETURN
170 S =  - 16336: FOR D = 1 TO 10
     :SN =  PEEK (S) -  PEEK (S) +
      PEEK (S) -  PEEK (S): NEXT
     : RETURN
180  COLOR= 6: FOR Z = 17 TO 36: FOR
     D = 1 TO 13: CALL 774: NEXT
     : HLIN 14,22 AT Z: NEXT :UP =
     0: RETURN
190 L =  INT ( RND (1) * 10):M =
      INT ( RND (1) * 10): IF L +
     M > 9 THEN 190
200  COLOR= 1:AA = 0:X = 4:Y = 3:
      ON L GOSUB 20,30,40,50,60,7
     0,80,90,100: IF L = 0 THEN  GOSUB
     110
210  COLOR= 2:AA = 0:X = 18: ON M
      GOSUB 20,30,40,50,60,70,80,
     90,100: IF M = 0 THEN  GOSUB
     110
220  COLOR= 12:X = 32: GOSUB 120:
      POKE  - 16384,0: POKE  - 16
     368,0: VTAB 23: HTAB 15: PRINT
     "HOW MANY ? ";: GET N$: IF  ASC
     (N$) < 48 OR  ASC (N$) > 57 THEN
      GOSUB 170: GOTO 220
230 N =  VAL (N$): COLOR= 6:X = 2
     9:Y = 1: GOSUB 540: COLOR= 9
     :AA = 0:X = 32:Y = 3: ON N GOSUB
     20,30,40,50,60,70,80,90,100:
      IF N = 0 THEN  GOSUB 110
240  IF N = L + M THEN 260
250 A = 1:B = 2:X = 29: FOR D = 1
      TO 8: GOSUB 130: NEXT : GOSUB
     180: GOSUB 150: GOTO 200
260 A = 12:B = 2:X = 1: FOR D = 1
      TO 8: GOSUB 130: NEXT : GOSUB
     160: IF UP = 20 THEN 280
270  GOSUB 150: GOTO 190
280  FOR D = 1 TO 16: CALL 774: CALL
     774: HOME : VTAB 23: PRINT  TAB(
     D)"YOU WIN";: CALL 774: FOR
     DD = 1 TO 300: NEXT : NEXT
290  HOME : VTAB 23: HTAB 16: FLASH
     : PRINT "YOU WIN";: FOR D =
     1 TO 20: PRINT  CHR$ (7);: NEXT
     : NORMAL : HOME : GOTO 560
300  FOR S = 768 TO 808: READ P: POKE
     S,P: NEXT
310  DATA 0,0,12,0,0,0,160,0,238,
     0,3,238,1,3,174,2,3,173,48,1
     92,136,208,10,206,0,3,208,5,
     206,1,3,240,5,202,240,234,20
     8,238,96,0,0
320  TEXT : HOME : NORMAL :AA$ =
     "THE BIG ADDING MACHINE":BB$
      = "BY GARY E. LEONARD"
330  VTAB 7: HTAB 9: FOR D = 1 TO
      LEN (AA$): PRINT  MID$ (AA$
     ,D,1);: CALL 774: FOR DD = 1
      TO 50: NEXT : NEXT
340  VTAB 12: HTAB 11: FOR D = 1 TO
      LEN (BB$): PRINT  MID$ (BB$
     ,D,1);: CALL 774: FOR DD = 1
      TO 100: NEXT : NEXT
350  FOR D = 1 TO 1000: NEXT
360  HOME :DD$ = "INSTRUCTIONS:":
     EE$ = "TRY TO FILL THE MACHI
     NE'S TANK BY":FF$ = "GETTING
      ALL THE CORRECT ANSWERS. WA
     TCH":GG$ = "OUT !!!! ONE WRO
     NG ANSWER AND THE TANK":HH$ =
     "GOES DRY."
370  VTAB 4: HTAB 15: FOR D = 1 TO
      LEN (DD$): PRINT  MID$ (DD$
     ,D,1);: CALL 774: NEXT
380  VTAB 9: HTAB 5: FOR D = 1 TO
      LEN (EE$): PRINT  MID$ (EE$
     ,D,1);: CALL 774: NEXT
390  PRINT : PRINT : PRINT
400  FOR D = 1 TO  LEN (FF$): PRINT
      MID$ (FF$,D,1);: CALL 774: NEXT

410  PRINT : PRINT : PRINT
420  FOR D = 1 TO  LEN (GG$): PRINT
      MID$ (GG$,D,1);: CALL 774: NEXT

430  PRINT : PRINT : PRINT
440  FOR D = 1 TO  LEN (HH$): PRINT
      MID$ (HH$,D,1);: CALL 774: NEXT

450  PRINT
460  VTAB 23: PRINT " PRESS SPACE
      BAR TO BEGIN.....";: GET
     ST$: IF (ST$) (  ) " " THEN
     460
470  GR : HOME : COLOR= 2: FOR X =
     0 TO 39: VLIN 0,39 AT X: NEXT
     : COLOR= 0:X = 1:Y = 1: GOSUB
     530:X = 15: COLOR= 0: GOSUB
     530:X = 29: COLOR= 0: GOSUB
     530
480 X = 1:Y = 17: GOSUB 550:Y = 2
     9: GOSUB 550:X = 29: GOSUB 5
     50:Y = 17: GOSUB 550
490  HLIN 13,25 AT 16: HLIN 13,25
      AT 37: VLIN 16,37 AT 13: VLIN
     16,37 AT 25: COLOR= 6: FOR Y
      = 17 TO 36: HLIN 14,24 AT Y
     : NEXT
500  COLOR= 0: FOR Y = 17 TO 35 STEP
     2: HLIN 23,24 AT Y: NEXT
510  HLIN 11,13 AT 7: VLIN 5,9 AT
     12: HLIN 25,27 AT 6: HLIN 25
     ,27 AT 8
520  GOTO 190
530  HLIN X,X + 8 AT Y: HLIN X,X +
     8 AT Y + 12: VLIN Y,Y + 12 AT
     X: VLIN Y,Y + 12 AT X + 8: COLOR=
     6: FOR Z = X + 1 TO X + 7: VLIN
     Y + 1,Y + 11 AT Z: NEXT : COLOR=
     0: RETURN
540  COLOR= 6: FOR Z = X + 1 TO X
      + 7: VLIN Y + 1,Y + 11 AT Z
     : NEXT : RETURN
550  HLIN X,X + 8 AT Y: HLIN X,X +
     8 AT Y + 8: VLIN Y,Y + 8 AT
     X: VLIN Y,Y + 8 AT X + 8: RETURN

560  VTAB 23: PRINT " ANOTHER GAM
     E ? ";: GET NU$: IF  ASC (NU
     $) (  ) 89 THEN  GR : TEXT :
      HOME : END
570  GOSUB 180: GOSUB 150: HOME :
      GOTO 190
```

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- Fast Bload
- Reset Run
- Reset Onerr
- Shape Table Converter
- Print Using ($.00)
- String Input
- Array Search (1D)
- Tones
- Error Handling Routine
- Calculated Goto
- Line # Data Restore
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- Matrix Multiply
- Matrix Inverse
- Array Randomize
- Array VAL
- Array STR$
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- Catalog to Array
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- Find Free Sector
- Mark Sector
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A Call —A.P.P.L.E. SOFTWARE REVIEW:

SPANISH FOR THE TRAVELER

Helen Hamerstrom/reviewer

Spanish For The Traveler $59.95
Southwestern Data
P.O. Box 582
Santee, CA 92071
Copy protected – master allows three back ups

SPANISH For The Traveler is a useful and attractively packaged program which may well get this year's award for the most appropriately named piece of software. It includes a series of easily paced lessons which guide the user through the words and phrases most needed by the traveler. One of the best aspects of the program is the choice of vocabulary. It is up to date, fairly simple and very practical. The package includes an excellent manual, four audio cassette tapes and the program disk.

The manual for Spanish For The Traveler is very easy to follow. Sometimes it is so thorough that the user, at least this user, can't wait to get to running the program. The program itself provides menus which are logical and you can have the lessons up and running quickly. More than half of the manual is a glossary which is a valuable reference for the student. It contains a printed list of the contents of each lesson.

Four audio cassettes accompany the program and provide a model of the correct pronunciation of each word. The tapes and the display are synchronized so that the word is displayed as the voice on the tape pronounces it. The tapes themselves are clear and the audio level is good. Because the tape is in a serial format, you have to follow the lessons in order or else hunt around on the tape for the correct starting spot. In fact, the manual suggests that you follow the units in order, and they do build from simple to more complex vocabulary. It would have been nice if a tape counter had been used and the manual contained the numbers for the location of each section. Nevertheless, the tapes provide a clear model for learning pronunciation.

The lessons are tightly organized around specific goals. In the manual, the section "Getting Started" tells you what you will be able to do at the end of each lesson. For example, after Unit I "you will be able to speak enough Spanish to arrive at the airport, pass through customs, collect your luggage, and check into your hotel." Comparing this goal to the vocabulary actually given (which includes words like "traveler's check," "hotel," "hotel room," "money exchange" and "suitcase" as well as "more slowly please" and "How do you say _____ in Spanish?"), it seems that the goal could in fact be reached by a person who mastered all of the expressions in the first unit.

In Spanish For The Traveler the first three lessons in a unit typically deal with nouns and the last two deal with sentences and expressions. This allows you to "mix and match." To use the first unit as an example, two of the sentences that you learn are:

"I don't have _____" and
"Where can I get _____"

Having already learned the nouns in the unit, you can say:

"I don't have a reservation."
"Where can I get a hotel room?"

or

"I don't have a rental car."
"Where can I get a taxi?" etc.

The expressions in the unit fit together so well that the actual number of sentences you can form is much larger than the number of vocabulary words given.

When you first boot up Spanish For The Traveler, the main menu offers seven units to choose from: "1. Your Arrival, 2. Shopping for Souvenirs, 3. Seeing the Sights, 4. Touring the Country, 5. Getting Acquainted, 6. Dining Out, 7. Numbers." All of the units except the last one are subdivided into lessons. After you have chosen a unit, the lessons are displayed on a menu similar to this one:

Your Arrival
1) Places
2) Things
3) People
4) Sentences
5) Expressions
6) Return to Main Menu

"Places," "Things" and "People" are all lists of nouns while "Sentences" and "Expressions" are just that. All of the lessons within a unit recombine well to increase the number of sentences you can form.

After you select a lesson, you have to insert the audio tape and find the point where that lesson begins. You are offered the option to change the rate at which the words appear on the screen. The left and right arrows make the display faster or slower. However, this is only useful for review because the speed of the tape presentation is fixed. The speed adjustment of the display is easy to change and restore if you want to experiment. Once you do select a speed, the program operates at that speed until you exit the lesson. Since the escape key allows you to exit back to the menu at any time, this is not a problem.

At the end of each lesson, the program presents a multiple choice vocabulary quiz. You have the option of working from English to Spanish or from Spanish to English. However, the questions do come up in exactly the order of the presentation and always in the same order. Since the manual urges you to master each lesson "100%" before moving on to the next lesson, a random order to the questions would have been more interesting.

education

Inside Apple

Vol. 1, No. 3

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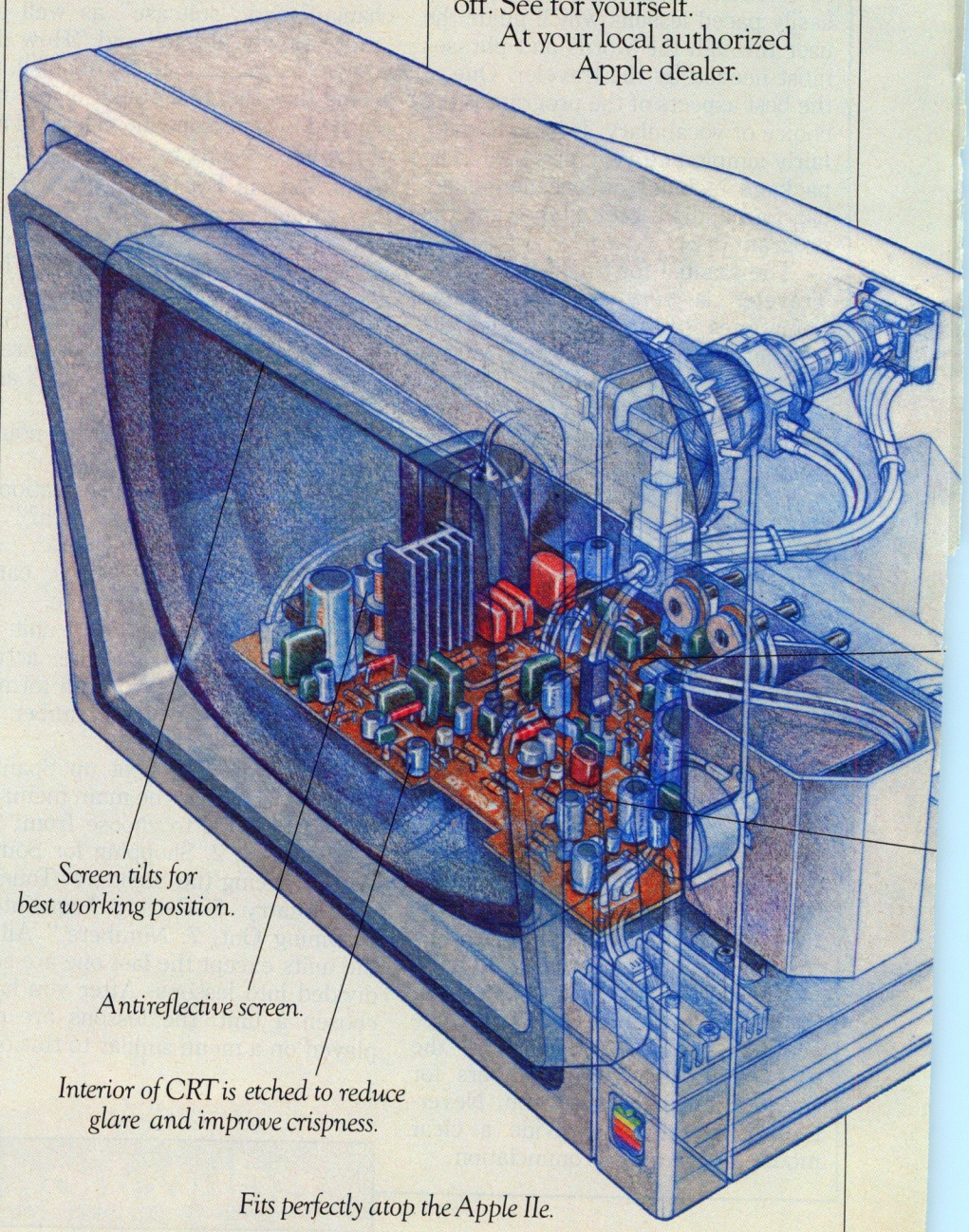

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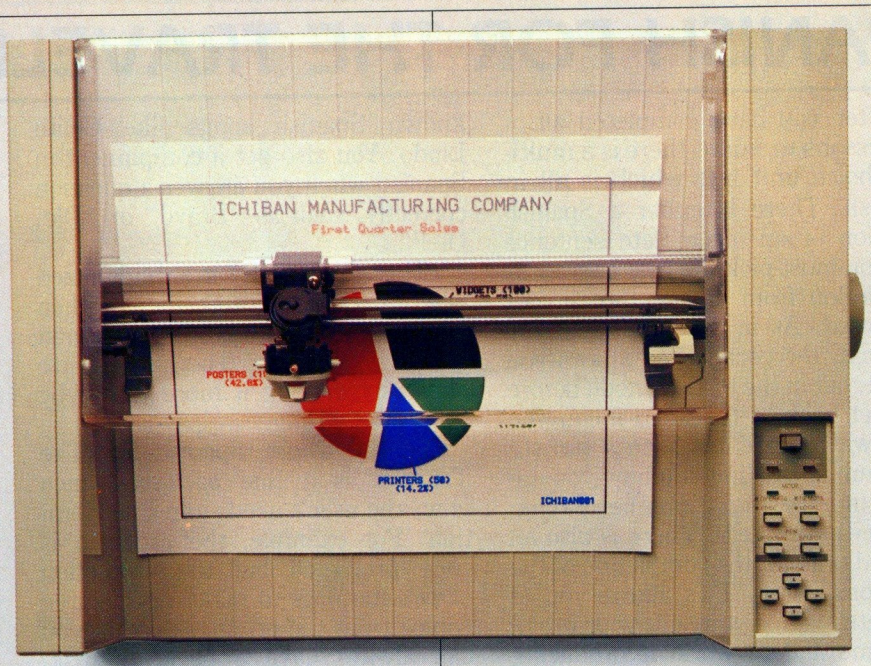

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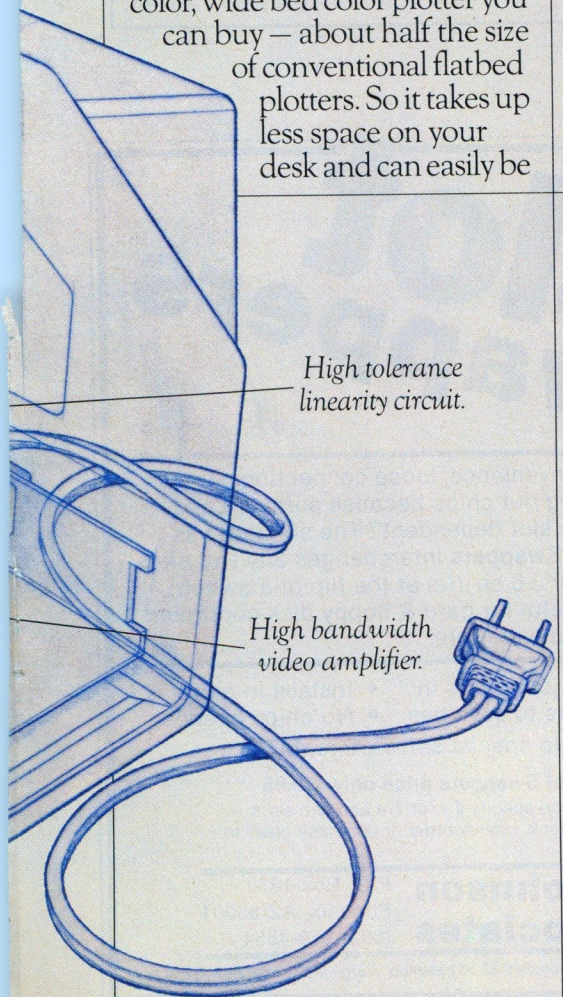

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SPANISH FOR THE TRAVELER

After you have completed all of the lessons in a unit, there is a multiple choice unit test which is all in Spanish. There is either a Spanish question or an incomplete sentence and you must pick the best answer or completion from among the choices presented. As in other parts of the program, the escape key allows you to exit, but in the testing mode before you get back to the main menu you are always presented with a statistical summary telling you how you are doing (number right, number wrong, number attempted). There is also an elapsed time for the completion of the questions noted. This allows you to compete against yourself, your previous time and to work at producing "automatic" Spanish — that is, Spanish that comes out quickly, without laborious word by word translation. You also have the option in the testing mode of turning the sound effects on or off. The sound effects consist of several bars from well known Spanish songs like Celito Lindo. You also get a compliment in Spanish when you answer a question correctly, such as "Bravo" or "Ole, Ole!".

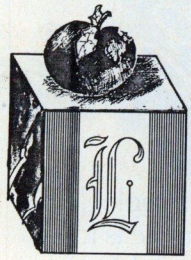
These "rewards" are randomized whereas the reinforcement when you're wrong is always the same and always in English. The authors are obviously making it more fun to be right than wrong.

On the whole, Spanish For The Traveler is a fine package which takes the user's needs into consideration. For example, the program is copy protected but the protection allows the user to make up to three copies from the original, so that you can always have a back up disk. There are, however, a few features that I wish the authors had included. I think that the tests and quizzes would have been more interesting if the questions did not appear in the same order as the presentation. A random mixing of the questions each time you take a quiz would be better, especially since you may take a quiz more than once. This is doubly true for the unit on numbers which is presented in numerical order, so there are no surprises, even in the presentation. I wish there were some use of graphics to make the display screen more interesting. Since the print is all done in graphics in order to show the Spanish accents, why not do a second "alphabet" of graphic symbols (mariachis, flowers, bulls, etc.) and intersperse them. I think that the display screen needs more "attention getters" to enhance learning.

In summary, I have to give this program a high recommendation overall. I think that it is especially valuable because the vocabulary is so well chosen and clearly presented.

education

APPLES APPLES APPLES . . . So What



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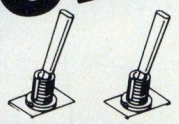

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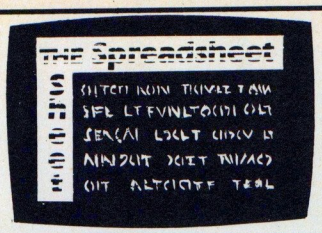
THE SPREADSHEET SHEET:

SPREADSHEETS IN THE CLASSROOM (Part One)

Jeffrey E. Jacques, Ph.D.



Who We Are and Where We Are Going

OVER the past four or five years, electronic spreadsheets — VisiCalc and VisiCalc clones — have become a staple of the business microcomputer environment. Books and articles abound on how to develop VisiCalc templates to solve business problems — e.g., estimate costs and sales, keep inventory records, report monthly sales and estimate future expenses and income. Some articles do exist for the home user, but these articles have a distinct business and bookkeeping flavor — e.g., keeping track of your checking account, working with state or federal taxes, and general home accounting. While there is inherently nothing wrong with this business orientation, in our judgement, all too few articles exist for people with widely divergent application needs — e.g. for the educator and his/her classroom management needs, for the scientist and his/her statistical analysis needs, or for people like you and me who are looking for alternate ways to apply a versatile and multi-faceted software package.

Why this emphasis on business? Well, look at the relatively high cost of most VisiCalc like programs — typically $200 to $300. This pretty well eliminated the home user and hobbiest who did not have specific business applications and those users who wished to simply explore what it could do. Not any more. After all, THE Spreadsheet is only $75.00 (to A.P.P.L.E. members).

Cost is not the only reason for this emphasis on business. Take educators as an example. While many educators have shown an increasingly great interest in microcomputer applications for instruction and administration, all too often we have fallen into the trap of unidimensional — some would say parochial — software thinking. Simply put, when we wish to find software for class grade management, we search for a software labeled as such. Similarly, scientists all too often will not buy a data analysis program unless it says "statistics" in its title.

Clearly, such programs exist and are an asset to the user. But, why struggle to master a program which has a single dimension when you can just as easily master and use a multi-dimensional routine? Indeed, the purpose of this column is to demonstrate multiple applications of THE Spreadsheet.

Perhaps the easiest place to begin demonstrating an alternative application is with something we have all had more than a passing acquaintance — *the grade book.* In this and the next article, I outline how you can use an electronic spreadsheet program and your Apple to do what any good class grade management routine should do: (1) establish and easily modify a class roster, (2) keep track of student test scores and be able to easily modify them, (3) compute and assign grades on individual tests, (4) combine test scores to determine and assign grades at the end of the grading period, (5) provide statistical summaries of class performance on each test, and (6) provide a facility for easy back-up copies and easy retrieval.

What You Will Need

I will begin with the assumption that you own or have access to a copy of an electronic spreadsheet program, preferably THE Spreadsheet, but if you must — VisiCalc, and that you have mastered: (1) how to load the program, (2) the general keystroke movements to enter data, labels and some formulae, (3) load and save your worksheet(s), and (4) use some functions. The functions we will use in the construction of your classroom grade management template include:

1. @MIN
2. @MAX
3. @SUM
4. @COUNT
5. @AVE
6. @INT
7. @SQRT
8. @LOOKUP

If you do not recognize some of these commands, a short trip to your documentation will help you follow the application outlined below. Do not worry if you have not mastered the @LOOKUP function, we will cover it thoroughly in the next issue.

Building a Grade Template

Before you run to load THE Spreadsheet, take a few minutes and think about what you are likely to encounter this term. Generally, a student's final grade is determined from tests, quizzes, term paper(s) and a final examination. In my Sociology of Education class, I plan to give two general tests, two quizzes, a comprehensive final examination and a term paper — a total of six entries per student.

In addition to these six entries for each student, I plan to enter each student's name, his/her total number of points accumulated to date, and the grade earned. It may not be apparent now, but we will need two columns to work out students' grades. Let's see now, that makes one column for each student's name, six columns for test/quiz/term paper entries, one column for accumulated points and two columns for computing and assigning each student's grade. That makes a total of 10 columns, at least for my Sociology of Education class.

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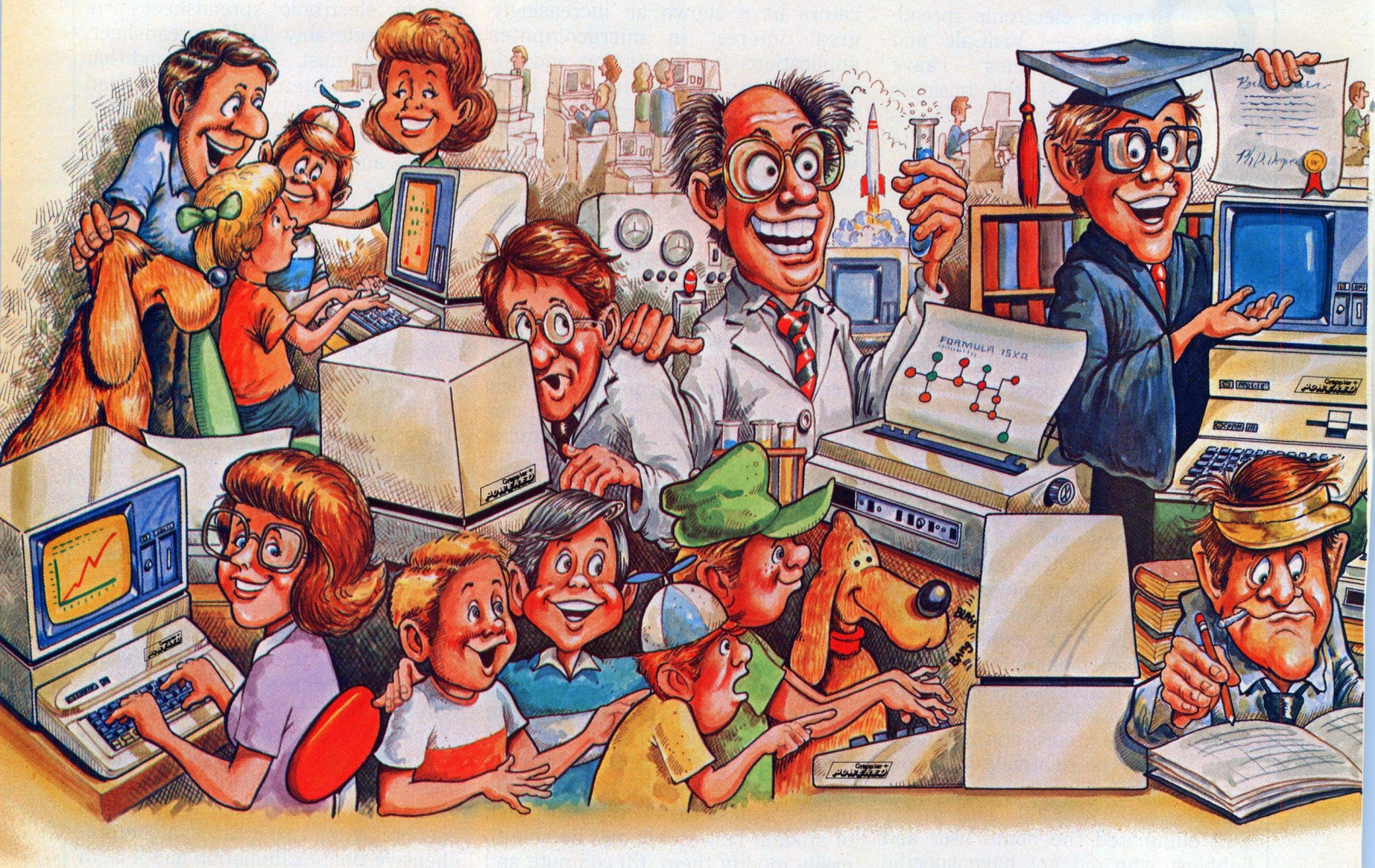

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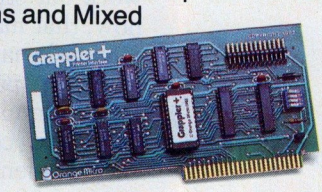

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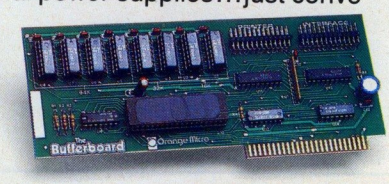

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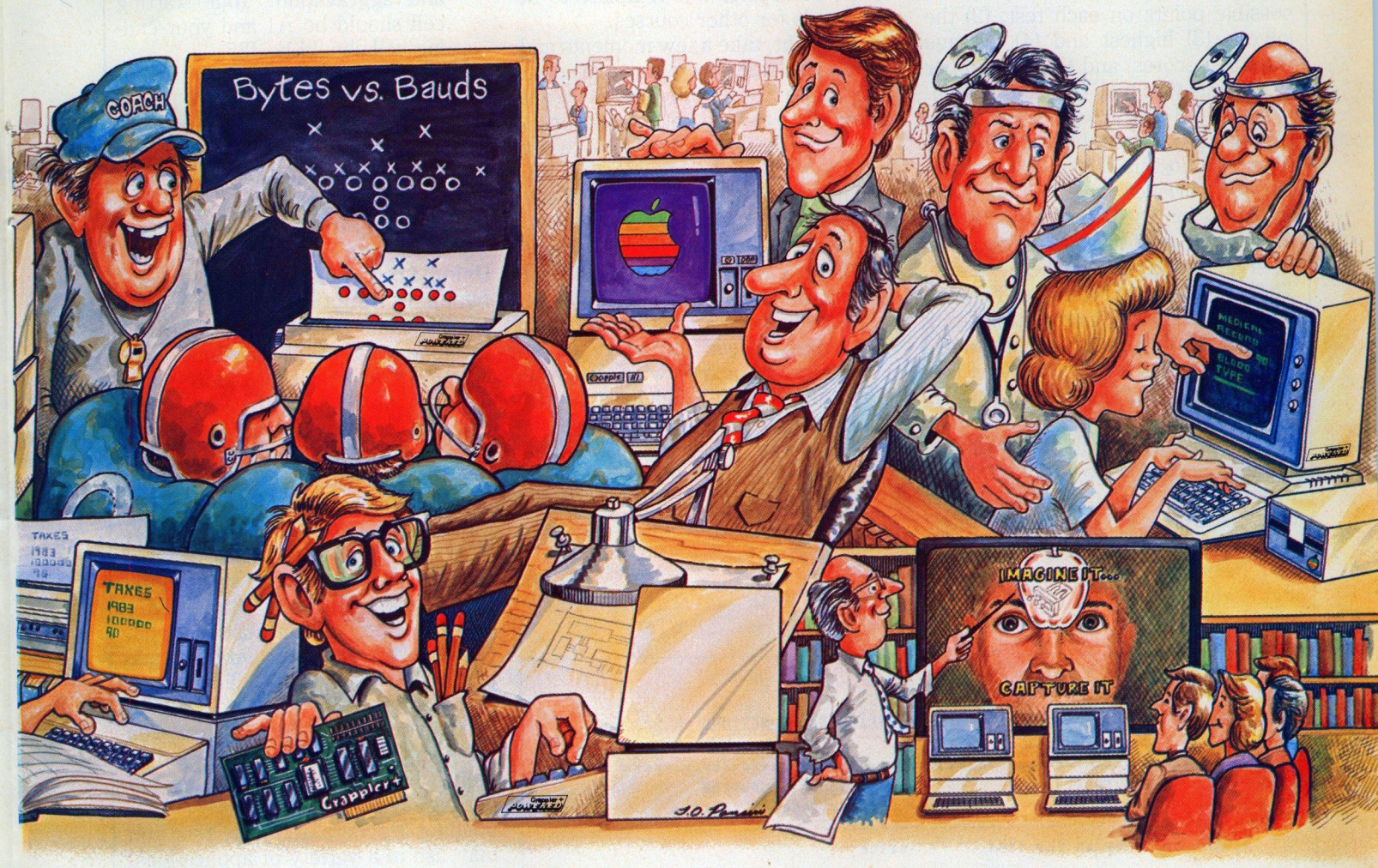

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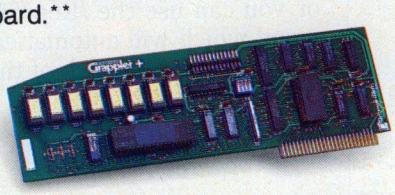

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The total number of rows will, of course, vary with the number of students enrolled in your class as well as the additional class summary statistics with which you wish to note. I had ten student's enrolled and I wish to note: (1) the number of possible points on each test; (2) the lowest, (3) highest and (4) average class test scores, and (5) the number of students who took the examination.

Finally, I like to keep track of the spread of scores about the mean score. To do this, I plan to compute the (6) variance and (7) standard deviation for each test. More about these in the next issue. For now, just reserve two rows for these values. Then, go ahead and examine Table 1. It presents the summary statistics I will use, THE Spreadsheet functions, and the computational strategy I use to solve for each statistic. Take a moment and examine Table 1.

The number of entries, rows and columns needed will, obviously, vary with your specific needs. But, stay with this model until you have mastered the skills below. By using the /Insert and /Delete commands, and slightly modifying a few cells, I can easily update my class roster. Because THE Spreadsheet displays all the data, I can easily keep track of student test scores and easily modify them by editing, adding or deleting the appropriate values. Come to think of it, with only a few more modifications, I can alter this template to fit my needs for other courses.

All right, take a few moments and create this template using your electronic spreadsheet program. Here are a few hints to help with your work:

1) Vary the column widths (using the /L command) so that you have a clear display of each student's name (say 15 characters).
2) Since test scores usually range from a one digit to a three digit number and column labels can be abbreviated, most of these data columns need be only six or fewer characters wide, and the columns I and J each need be only three columns wide. This will allow you to use your 80 column card or 70 column mode and display the entire data set.
3) After entering the repeating label command, /–, and then the label of "–" or "=" in column A, simply reproduce them across the remaining columns with the /R command. This saves time and aggravation. Your starting cell should be A1 and your ending cell should be J25.

Okay, go ahead and do it. I'll wait for you.... You might wish to peek ahead and check the labels you have entered against the labels listed in Table 2. Now to examine the functions listed in this table.

TABLE 1.

SUMMARY STATISTICS AND AVAILABLE SPREADSHEET FUNCTIONS

Information	SPREADSHEET Function Computational Strategy
1. Number of items on the test	value
2. Lowest student score	@MIN
3. Highest student score	@MAX
4. How many students took the examination	@COUNT
5. Average Test Score	@AVE
6. Variance	Computed values @SUM((Score-Mean)^2)/@COUNT
7. Standard Deviation	Computed values @SQRT(Variance)
8. Rounding off for percents at .00	@INT(((COORD1/COORD2)*10000+.5))/100

Using Some of the Available Functions

Welcome back. This section will examine some of the functions available for your easy use. Before going too far, make sure that you have changed the Recalculation Mode and set it to Manual rather than Automatic. This will allow quicker, and therefore, easier entry of your formulae and data.

There are at least two schools of thought about the next step. Some people argue that you should enter the data first, so you may see what happens at each step. Others argue that you should finish building your template, thereby keeping track of where you wish to go and how you are going to get there. In my judgement, the latter option is more appealing since we are interested in building a general template that you may use in a variety of applications. We will, therefore, postpone entering data — for the moment. Now, to the standard functions!

To keep a running sum of the total number of points accumulated by each student, simply enter in column H the function @SUM(B6...G6). A zero should appear in cell H6. You can now re-enter this function for each row from row 7 through row 15, or you can use the /Reproduce command which will automatically insert this function into each of these rows.

education

Simply enter /R. Once entered, the edit line will display H6. Enter a :H7...H15 and then return. When you answer "Relative" to the queries in the reproduce command, B6 with become B7, or B8, or...B15 and G6 will become G7, or G8, or...G15, where appropriate. Check it out by moving the cursor to cells H7, H8, etc. See Table 2.

Well, this is a good time to enter the values for each student. You may, at this time, enter the scores in column for Test # 1 in column B. See Table 3. Make sure that you enter all the values in rows 6 through 18, including the value of 20 in cell B18.

This is as far as we go in this first article. This is a good time to SAVE your worksheet.

In The Next Issue

As in all proverbial sequential articles, the phrase "in the next issue" comes to the fore. But, really, in the next issue, we will explore how to use THE Spreadsheet to further summarize class statistics by incorporating some of the standard functions to help us to compute and report percents, variance, and standard deviation. We will explore also how to use a look-up table to determine and assign grades. See 'ya then.

TABLE 2. INTIAL MASTER TEMPLATE

	A	B	C	D	E	F	G	H	I	J
1		FINAL GRADES FOR SOCIOLOGY OF EDUCATION								
2										
3	Student's Name	TST1	Qz#1	TST2	Qz#2	Final	TermPp	PTS	Grade	
4										
5										
6	Student # 1						@SUM(B6...G6)			
7	Student # 2						@SUM(B7...G7)			
8	Student # 3						@SUM(B8...G8)			
9	Student # 4						@SUM(B9...G9)			
10	Student # 5						@SUM(B10...G10)			
11	Student # 6						@SUM(B11...G11)			
12	Student # 7						@SUM(B12...G12)			
13	Student # 8						@SUM(B13...G13)			
14	Student # 9						@SUM(B14...G14)			
15	Student #10						@SUM(B15...G15)			
16										
17										
18	N.of items/pts.	20								
19	Low Score	@MIN(B6...B15)			...		@MIN(H6...H15)			
20	High Score	@MAX(B6...B15)			...		@MAX(H6...H15)			
21	Count	@COUNT(B6...B15)			...		@COUNT(H6...H15)			
22	Average	@AVE(B6...B15)					@AVE(H6...H15)			
23	Variance									
24	Standard Dev.									
25										
26										

Note: Columns are not aligned precisely so that you may more easily see the formulae.

Returning to column B, and beginning with row 19, we can have THE Spreadsheet compute for Test #1 the following values with the following functions: the lowest score = @MIN (B6. . .B15) — enter in row 19; the highest score = @MAX(B6...B15) — enter in row 20; count of the number of students who took the examination = @COUNT(B6. . .B15) in row 21; and average test score = @AVE (B6...B15) — in row 22. Each of these functions and their resulting computed values can be replicated across columns C through H and the /R command.

Your worksheet should display a large number of zeroes by now and should include the functions summarized in Table 2. This table will serve as our initial master template.

TABLE 3. STUDENT VALUES

	A	B	C	D	E	F	G	H	I	J
1		FINAL GRADES FOR SOCIOLOGY OF EDUCATION								
2										
3	Student's Name	TST1	Qz#1	TST2	Qz#2	Final	TermPp	PTS	Grade	
4										
5										
6	Student # 1	10	6	11	7	68	85	187		
7	Student # 2	15	8	14	7	90	85	219		
8	Student # 3	11	8	11	8	74	70	182		
9	Student # 4	17	8	11	8	92	70	206		
10	Student # 5	8	8	9	8	62	80	175		
11	Student # 6	12	7	11	8	85	80	203		
12	Student # 7	12	8	9	7	78	75	189		
13	Student # 8	17	8	11	6	82	75	199		
14	Student # 9	13	8	9	7	84	75	196		
15	Student #10	11	8	10	8	78	85	200		
16										
17										
18	N.of items/pts.	20	10	15	10	100	100	255		
19	Low Score	8	6	9	6	62	70	175		
20	High Score	17	8	14	8	92	85	219		
21	Count	10	10	10	10	10	10	10		
22	Average	12.6	7.7	10.6	7.4	79.3	78	195.6		
23	Variance									
24	Standard Dev.									
25										
26										

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Glen Ferreri

I was really excited when my copy of THE Spreadsheet arrived. At last a spread sheet program that would take advantage of the large storage space I have on my Corvus hard disk, and also allow me to use a full 80 column screen. I got the program up and running right away and, after trying it out in 40 column mode, I turned to the section on the configuration subsystem to see about implementing the 80 column mode.

Now I was upset. I have had my Apple system operating since 1979, and because there were not any dependable 80 column boards on the market at that time, I had purchased a Soroc IQ 120 terminal and interfaced it to the Apple with a slightly modified Communications Card (to allow 9600 baud) in slot 3. Unfortunately, while THE Spreadsheet was designed to work with 80 column boards, no provision was made for external terminals.

After a call to the *Call -A.P.P.L.E.* Hot Line it became apparent that I would have to solve this one myself. Although THE Spreadsheet allows for a video driver, which could be used to output the screen display to the external terminal, it does not allow for an external keyboard (keyboard driver). If I could locate the code in THE Spreadsheet that accessed the keyboard, then I could patch it to access the keyboard on my Soroc.

After a little disassembling and documenting (make that a lot), the keyboard input routine revealed itself as residing at $82F9 through $83B7. (The actual references to the keyboard are made with an LDA $C000 at $8316 to load the current character from the keyboard, following which bit 7 is checked to see if it is a legitimate character, and at $8329 a BIT $C000 guarantees that the previously read character was correct (for debounce purposes), and a BIT $C010 at location $83AF resets the keyboard strobe.)

Now for some assembly language programming. I chose to make my changes to THE Spreadsheet via a video driver. Thus the changes are made when the video driver is loaded and run. This allows THE Spreadsheet to remain unmodified so that if my system changes in the future I will only have to replace the driver.

In the accompanying listing, I will describe some of the details of the keyboard driver. The first time THE Spreadsheet calls the driver, execution begins with a jump to FIRST. THE Spreadsheet program looks at the fourth through sixth byte of a video driver for information about how the driver will display the screen. The jump at the beginning skips these information bytes. The first information byte (fourth from the beginning) is the screen width, in this case $4F (80 decimal). The next byte is a control byte. Setting bit 6 of this byte tells THE Spreadsheet to look at the next byte for the screen length. The last information byte is the screen length, in this case $18 (24 decimal). If bit 6 of the control byte is reset (0), then this byte is ignored.

```
: A S M
                    ********************************
                    *                              *
                    * SOROC Video Terminal Driver  *
                    *   for THE Spreadsheet 2.0    *
                    *                              *
                    *     by Glenn R. Ferreri      *
                    *                              *
                    * Call -A.P.P.L.E. : Oct. 1983 *
                    *                              *
                    *                              *
                    ********************************

                    WNDLFT   =    $20        ;Monitor screen
                    WNDTOP   =    $22        ; left top and
                    WNDBTM   =    $23        ; bottom loc'ns
                    INVFLG   =    $32
                    CSWL     =    $36
                    CSWH     =    $37
                    WNDWTH   =    $9D        ;Spreadsheet width
                    CV       =    $9E        ;Spreadsheet
                    CH       =    $9F        ; vert & horiz
                    SLOT     =    $AC7
                    OUTFLG   =    $F4C       ;Init 00
                    COUT     =    $FDED
                    *
                              ORG  $1F00
                    *
                    *
1F00: 4C 06 1F                JMP  FIRST
                    *
1F03: 4F            WNDSZ    HEX  4F         ;Width of screen
1F04: 40            STAT     HEX  40         ;Control byte
1F05: 18            WNDLG    HEX  18         ;Length of screen
                    *
1F06: 48            FIRST    PHA             ;Save character
```

SPREADSHEET VIDEO TERMINAL DRIVER

The section at FIRST makes the patches to THE Spreadsheet by inserting jump to subroutine calls at the normal keyboard access points. The subroutine labeled KEYBIT replaces a BIT $C000, KEYDAT replaces an LDA $C000, and the KEYCLR routine replaces the BIT $C010.

The routine at BEGIN starts the output section. First, the jump vectors are set to $C300 for the Communications Card in slot 3. Next a check is made for inverse video, and since a Soroc terminal has no inverse video capability, I chose to display any inverse text as lower case. (Without this, THE Spreadsheet menus are difficult to operate.) To position the cursor on the screen, THE Spreadsheet outputs the command sequence $99, $9E, CH, and CV, where CH is the horizontal position plus $A0 and CV is the vertical position plus $A0. The Soroc on the other hand expects the sequence $9B, $BD, CV, and CH, therefore the driver checks for the beginning of a cursor positioning command by looking for a $99. If it is found, then the routine at NETRAP throws away the lead-in sequence and saves the CV and CH values. Control is then passed to the ENDTP routine which outputs the expected lead-in sequence and the CV and CH values.

A similar process occurs with the handling of a HOME and CLEAR operation. THE Spreadsheet outputs an $8C, the Soroc expects a $9E (home), $9B, $D9 (clear). When an $8C is detected, the routine at HOME is called to output the proper sequence. After calling a driver, THE Spreadsheet saves the contents of the jump vector for future reference. The routine at RESTORE therefore sets the jump vector to BEGIN before returning, so the patch routine is not called repeatedly with the display of each character.

The input routines should be reasonably clear. Location $C0BE + n0 (where n is the slot) is the status register for a communications card. If bit 0 is set, then there is a character ready in the data register. The data register is at $C08F + n0, and once read will reset the data ready flag in the status register. Since the data ready flag for the Apple keyboard (bit 7 of the data register) is not reset by a read, the input routines maintain a seperate local status byte to simulate the Apple keyboard action. (The Soroc terminal transmits an $8C when a right arrow key is pressed, while the Apple transmits a $95.) The KEYDAT routine therefore changes any $8C character into a $95 to allow the use of the right arrow key.

With very few changes, this driver could be used with other external terminals also using the Apple Communications Card. A little more work would be required to use a parallel card. I don't believe that a terminal using a serial card could be used, since THE Spreadsheet expects an incoming character to be latched, but if someone has such a configuration, I expect they will prove me wrong.

The driver is not written with the best style code. Most initializing has been left to THE Spreadsheet and the ROM on the Communications Card. This is because the driver must reside between addresses $1F00 and $2000. I had a difficult time making the driver short enough to fit in this space, and had to resort to using one location for a counter (OUTFLG) which resides within THE Spreadsheet program. This location is the last byte on the title page and is zero (which saves the initializing). If you need to make very many changes to the routine for your use, make sure it does not grow in length.

```
1F07: A9 20     36
1F09: 8D 29 83  37
1F0C: 8D 3D 83  38
1F0F: 8D 16 83  39
1F12: 8D AF 83  40
1F15: A9 E6     41
1F17: 8D 2A 83  42
1F1A: A9 1F     43
1F1C: 8D 2B 83  44
1F1F: A9 D4     45
1F21: 8D 3E 83  46
1F24: 8D 17 83  47
1F27: A9 1F     48
1F29: 8D 3F 83  49
1F2C: 8D 18 83  50
1F2F: A9 CC     51
1F31: 8D B0 83  52
1F34: A9 1F     53
1F36: 8D B1 83  54
1F39: 68        55
1F3A: 48        56  BEGIN
1F3B: AD FF 1F  57
1F3E: 85 37     58
1F40: AD FE 1F  59
1F43: 85 36     60
1F45: A5 32     61
1F47: C9 FF     62
1F49: F0 0E     63
1F4B: 68        64
1F4C: 48        65
1F4D: C9 C1     66
1F4F: 90 08     67
```

```
LDA   #$20        ;Patch Spreadsheet keyboard
STA   $8329       ; input routines to use the
STA   $833D       ; routines included here
STA   $8316
STA   $83AF
LDA   #<KEYBIT
STA   $832A
LDA   #>KEYBIT
STA   $832B
LDA   #<KEYDAT
STA   $833E
STA   $8317
LDA   #>KEYDAT
STA   $833F
STA   $8318
LDA   #<KEYCLR
STA   $83B0
LDA   #>KEYCLR
STA   $83B1
PLA               ;Recover character
PHA               ;Save character
LDA   HIADD       ;Normal entry
STA   CSWH        ; at begin
LDA   LOADD
STA   CSWL
LDA   INVFLG
CMP   #$FF
BEQ   NOMASK      ;Normal display
PLA
PHA
CMP   #$C1
BCC   NOMASK
```

```
1F51: C9 DB      68             CMP  #$DB
1F53: B0 04      69             BCS  NOMASK
1F55: 68         70             PLA
1F56: 09 20      71             ORA  #$20        ;Display inverse
1F58: 48         72             PHA              ; as lower case
1F59: 68         73   NOMASK    PLA
1F5A: 48         74             PHA
1F5B: C9 99      75             CMP  #$99        ;Is it cursor pos'n cmd?
1F5D: F0 1B      76             BEQ  NETRAP
1F5F: C9 8C      77             CMP  #$8C        ;Is it HOME and CLEAR?
1F61: F0 57      78             BEQ  HOME
1F63: 20 ED FD   79             JSR  COUT
1F66: A5 36      80   RESTOR    LDA  CSWL
1F68: 8D FE 1F   81             STA  LOADD
1F6B: A5 37      82             LDA  CSWH
1F6D: 8D FF 1F   83             STA  HIADD
1F70: A9 3A      84             LDA  #<BEGIN
1F72: 85 36      85             STA  CSWL
1F74: A9 1F      86             LDA  #>BEGIN
1F76: 85 37      87             STA  CSWH
1F78: 68         88             PLA
1F79: 60         89             RTS
                 90   *
1F7A: 68         91   NETRAP    PLA
1F7B: 48         92   TRAP      PHA
1F7C: EE 4C 0F   93             INC  OUTFLG      ;Ignore cursor pos. cmd
1F7F: AD 4C 0F   94             LDA  OUTFLG      ; and capture horiz and
1F82: C9 04      95             CMP  #$4         ; vert pos. for later use by ENDTP
1F84: F0 0D      96             BEQ  ENDTP
1F86: A9 7B      97             LDA  #<TRAP
1F88: 85 36      98             STA  CSWL
1F8A: A9 1F      99             LDA  #>TRAP
1F8C: 85 37      100            STA  CSWH
1F8E: 68         101            PLA
1F8F: 8D FD 1F   102            STA  SAVEA
1F92: 60         103            RTS
                 104  *
1F93: A9 00      105  ENDTP     LDA  #$0         ;Restore trap counter
1F95: 8D 4C 0F   106            STA  OUTFLG      ; and output vector
1F98: AD FF 1F   107            LDA  HIADD
1F9B: 85 37      108            STA  CSWH
1F9D: AD FE 1F   109            LDA  LOADD
1FA0: 85 36      110            STA  CSWL
1FA2: A9 9B      111            LDA  #$9B        ;Send cursor pos cmd for SOROC IQ 120
1FA4: 20 ED FD   112            JSR  COUT
1FA7: A9 BD      113            LDA  #$BD
1FA9: 20 ED FD   114            JSR  COUT
1FAC: 68         115            PLA              ;Recover vert pos and send it
1FAD: 48         116            PHA
1FAE: 20 ED FD   117            JSR  COUT
1FB1: AD FD 1F   118            LDA  SAVEA       ;Recover horiz and send it
1FB4: 20 ED FD   119            JSR  COUT
1FB7: 4C 66 1F   120            JMP  RESTOR
                 121  *
1FBA: A9 9E      122  HOME      LDA  #$9E        ;Do HOME and CLEAR for SOROC
1FBC: 20 ED FD   123            JSR  COUT
1FBF: A9 9B      124  CLRSC     LDA  #$9B
1FC1: 20 ED FD   125            JSR  COUT
1FC4: A9 D9      126            LDA  #$D9
1FC6: 20 ED FD   127            JSR  COUT
1FC9: 4C 66 1F   128            JMP  RESTOR
                 129  *
1FCC: 48         130  KEYCLR    PHA              ;Simulate clear keyboard
1FCD: A9 00      131            LDA  #$0         ; command LDA $C01x
1FCF: 8D FC 1F   132            STA  STATUS
1FD2: 68         133            PLA
1FD3: 60         134            RTS
                 135  *
1FD4: 20 E6 1F   136  KEYDAT    JSR  KEYBIT      ;Simulate get keyboard
1FD7: 30 01      137            BMI  CONT        ; data command LDA $C000
1FD9: 60         138            RTS
                 139  *
1FDA: 08         140  CONT      PHP
1FDB: AD BF C0   141            LDA  $C0BF
1FDE: C9 8C      142            CMP  #$8C
1FE0: D0 02      143            BNE  DONE
1FE2: A9 95      144            LDA  #$95
1FE4: 28         145  DONE      PLP
1FE5: 60         146            RTS
```

SPREADSHEET VIDEO TERMINAL DRIVER

```
                     147  *
1FE6  8D FD 1F       148  KEYBIT   STA  SAVEA     ;Simulate keyboard input
1FE9: AD FC 1F       149          LDA  STATUS    ; ready command BIT $C000
1FEC: 30 08          150          BMI  NOCHG
1FEE: AD BE C0       151          LDA  $C0BE
1FF1: 6A             152          ROR
1FF2: 6A             153          ROR
1FF3: 8D FC 1F       154          STA  STATUS
1FF6: 08             155  NOCHG   PHP
1FF7: AD FD 1F       156          LDA  SAVEA
1FFA: 28             157          PLP
1FFB: 60             158          RTS
                     159  *
1FFC: 00             160  STATUS  HEX  00
1FFD: 00             161  SAVEA   HEX  00
1FFE: 00             162  LOADD   HEX  00
1FFF: C3             163  HIADD   HEX  C3

--End assembly, 256 bytes, Errors: 0
```

A Call —A.P.P.L.E. UTILITY:

QUICK ZAPPER

Stowe Keller/Val J. Golding

```
]LIST

10  REM

QUICK ZAPPER BY STOWE KELLER AND
        VAL J GOLDING

  CALL -A.P.P.L.E. : OCT. 1983

100  HOME : GOSUB 1500:IO = 47080

110  PRINT "USE DECIMAL VALUES": PRINT
     : INPUT " TRACK? ";TR: IF TR
      < 0 THEN  PRINT : PRINT "AB
     ORTED": END
120  INPUT "SECTOR? ";SE: IF CM =
     2 THEN  RETURN : REM
200  POKE IO + 4,TR: POKE IO + 5,
     SE
210  PRINT : INVERSE : PRINT " SE
     LECT: ";: NORMAL : PRINT " Q
     UIT [0] READ [1] WRITE [2] "
     ;: GET CM$:CM =  VAL (CM$): ON
     CM = 0 GOTO 800: ON CM = 2 GOSUB
     3000: IF CM <  > 1 AND CM <
      > 2 THEN 210
220  POKE IO + 12,CM
230 BU = 8192: POKE IO + 8,BU - 2
     56 *  INT (BU / 256): POKE I
     O + 9,BU / 256: REM
[BU]FFER MAY BE CHANGED TO ANY
AVAILABLE MEMORY LOCATION

240  POKE IO + 3,0: POKE 5,0: REM
     ERR CODE

300  CALL 768: REM
ACCESS DISK VIA RWTS

310  IF  PEEK (5) THEN  PRINT : PRINT
     "SORRY, ERROR " PEEK (5)" OC
     CURED": STOP : REM

500  ON CM GOSUB 2000,2010: PRINT
     : IF CM = 2 THEN  END : REM

600  PRINT "SECTOR WAS LOADED AT
     $2000.20FF AND MAY NOW BE EX
     AMINED AND MODIFIED WITH ANY
        MONITOR COMMAND. YOU WILL
      BE RETURNED TOBASIC AFTER E
     ACH EDIT AND MAY WRITE THE S
     ECTOR BACK TO DISK OR CONTIN
     UE EDITING": PRINT
610  GOSUB 1000
620  PRINT : PRINT : PRINT "CONTI
     NUE EDIT OR RETURN TO PROGRA
     M [E/R]";: GET A$
630  ON A$ = "E" GOTO 610: GOTO 2
     10: REM

800  PRINT : END : REM

1000 HEX$ = "": HTAB 1: POKE 51,1
     70: CALL 64874: FOR I = 1 TO
     239:CHR =  PEEK (511 + I): ON
     CHR = 141 GOTO 1510:HEX$ = H
     EX$ +  CHR$ (CHR - 128): NEXT
     : GOTO 1510
1500 HEX$ = "300:20 E3 3 20 B5 B7
      90 5 AD F5 B7 85 5 A9 0 85
     48 60": REM
RELOCATABLE CODE; IF CHANGED, BE
SURE TO CHANGE CALL IN LINE 300

1510 HEX$ = HEX$ + " N D9C6G": FOR
     I = 1 TO  LEN (HEX$): POKE 5
     11 + I, ASC ( MID$ (HEX$,I))
      + 128: NEXT : POKE 72,0: CALL
      - 144: RETURN : REM
S H LAM ROUTINE

2000  GOSUB 2500: PRINT " READ ":
      RETURN
2010  GOSUB 2500: PRINT " WRITTEN
      TO DISK": RETURN : REM

2500  PRINT : PRINT : PRINT "TRAC
     K "TR", SECTOR "SE;: RETURN

3000  GOSUB 110: PRINT : PRINT : FLASH
     : PRINT "OK TO WRITE TO DISK
      [Y/N] ";: NORMAL : GET A$: IF
     A$ <  > "Y" THEN  POP : HOME
     : GOTO 210
3010  RETURN
```

KEEP IT CLEAN

Jim Hockenhull/Call —A.P.P.L.E. staff writer

TALK about hardware problems! Not that I haven't had my share of them in the past. Like the time one of those little tantalum capacitors on the motherboard blew up — I mean literally *blew up!* — filling the house with the alarming smell of scorched electronics. The charred smudge remains on the inside of the cover to this day, mute testimony to one of the things that can go wrong with an Apple.

This was different. About half the time on power-up, the computer would not display a neat field of question marks but a field crossed by bands of other characters, some of them changing right before my eyes. And no cursor! I soon found that flexing the motherboard in *just the right spot* would usually cure the problem. What the. . .?? Occasionally, the video image would start to twitch and flicker; hitting the right side of the case smartly seemed to be the solution.

But, hey! we're talkin' *computers!* Baby brothers of the machines that keep airplanes in the air and spaceships in space. Machines which, we presume, will make sure our future weaponry will zap only the powers of Evil, never the forces of Good. Smack such devices a good one up 'side the head? Go through a ritual of kicking and shoving like Wally Cox getting into his locker on the old "Mr. Peepers" show? Doesn't give a fella a whole lot of confidence.

Things became intolerable when I lost touch with the disk controller. Enter "6 [Ctrl-P]" and the old Apple would disappear into the Great Binary Void, not to return until shut down and re-powered. Stick the controller card into slot #5 and everything's fine. Aha! slot #6 is at fault! Stick a different card into #6 and all's swell. Card works, slot works, card in slot doesn't work. What's the deal?

When this occurred during a lecture to the Palouse Microcomputer Club, I threw myself on the wisdom of that body. They agreed it was all mighty mysterious. One young man was heard to mutter something about loose chips. Shut up, kid, I got a real problem here! I called my dealer. "Sounds strange," she said. "Let us know when you can bring it in. We'll try to get it done the same day, but something like this could take longer." My nearest friendly local Apple agency is thirty miles away. I might have to fit some 120 miles of driving into a schedule that was tighter than the skin on a sausage.

At work I poured out my troubles to the man in charge of our department's Apple][+. "Well," he said, "the motherboard chips *do* have a way of working loose. I've made it a practice to take the case off once a month and press all the chips back into their sockets. At the same time, I clean all the contacts on the peripheral cards. Keeps things working right."

This was all news to me, and it sounded kind of goofy. How could chips work loose? I certainly don't type *that* hard. But, any old port in a storm, as they say. That very evening I did as my colleague suggested. I took out each peripheral card and wiped off its contacts with alcohol and a soft cloth. Next, I removed the Apple's case, carefully disconnecting the keyboard cable. With my trusty Radio Shack IC inserter, I pressed down each chip, firmly but gently — the motherboard isn't terribly well supported in the middle. Some chips moved noticeably.

I replaced the case, making sure the keyboard connecter was seated properly in its socket, reinserted the peripheral cards, and, with bated breath, powered up the computer. Lo and behold, a field of question marks! And a cursor! And a disk boot! And a stable video image! The fix had worked! And it continues to work.

The point of all this is that though computers are solid state, their brains concealed in microscopic traces on silicon, they are still composed of physical units which can break, get dirty, or wiggle loose. While most computer repairs are beyond the abilities of mere mortals, the routine I've just described is simple — and *free.* Being a smart lad who learns quickly, I've added it to my maintenance schedule along with cleaning my disk drive's read/write head even when I know it doesn't *really* need it. If you're being plagued with weird, intermittent problems that don't seem related to software, I'd suggest getting out the screwdriver, the alcohol, and the IC tool. It could be among the best fifteen minutes you've spent.

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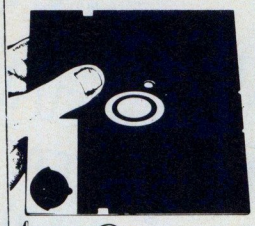

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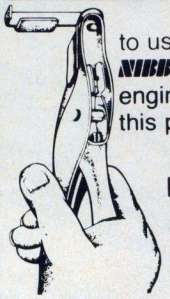

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FLYING HIGH

Earl Keyser

HELLO and welcome to the world of E-Z PILOT. In this and future columns, I will discuss and, hopefully, explain how to use E-Z PILOT, *CALL -A.P.P.L.E.'s* version of the language PILOT.

What is PILOT? The letters are an acronym for Programmed Instruction, Learning Or Teaching. PILOT was conceived in 1968 by Dr. John Starkweather, a professor at the University of California. Dr. Starkweather saw a need for a *simple* language which would allow him to write lessons for himself and his students. Since much computer assisted instruction, particularly tutorial, is a matter of string handling, he needed an easy way to print strings, accept them as answers and evaluate the accuracy of the student's response, So, he created PILOT on a DATAPOINT computer. Later, versions were to appear on HP, DEC and even IBM computers.

But the excitement didn't really begin until 1976 when, in Dr. Dobbs' Journal, he published a version of PILOT for an 8080-based computer. Then, whoosh, PILOT really began to fly.

For example, Doctors George Gerhold and Larry Kheriaty of Western Washington University founded a company called MicroPi to create versions of PILOT for many microcomputers. It is their version of PILOT, called COMMON PILOT that is probably the most common these days. For example, Apple PILOT is the Apple Computer, Inc. version of Common PILOT, with Apple specific things attached. For those interested, it is really written in Pascal, not machine code or BASIC.

E-Z PILOT is a version of PILOT written specifically for the Apple][and Apple *//e*. It is written in Applesoft for two very good reasons. First, I wanted it to be modifiable by the people who would use it. For example, modifications which are quite easy to make can have E-Z PILOT turn on a device such as a tape recorder or have E-Z PILOT store a student's scores in a file. Just a few lines of BASIC code in E-Z PILOT are all you need to add. The other reason was my belief that you don't use a tank to crack a walnut. And PILOT is really a walnut of a language.

But you ask, raising your voice and eyebrows, *What is PILOT?* Well, let's look at an example and work from there. To wit, (I used to be an English teacher and love those funny little phrases):

```
T: Mary had a little lamb
T: and the doctor was quite
surprised.
T:
T: What do you think happened
T: when Old MacDonald had a
farm
A:
T: I agree!
```

The first five lines simply print out their text on the screen, Line six, the one beginning with the A:, is asking for an answer from you. The last line prints a noncommital response.

If you program in BASIC, you would write something like this:

```
10 PRINT "Mary had a little lamb"
20 PRINT "and the doctor was
   quite surprised."
30 PRINT
40 PRINT "What do you think
   happened"
50 PRINT "when Old MacDonald
   had a farm";
60 INPUT A$
70 PRINT "I agree!"
```

All those messy PRINT's and quotation marks. YUCK!

All you need to do in E-Z PILOT is to precede whatever you want to print out with T:, which stands for TYPE. Actually, the T stands for TYPE and the colon acts as a separator.

To accept a response from the person tickling the keys, you simply type A:. The previous sentence will have a question mark appended automatically. And, the answer will be stored. Why store the answer? Well...

Much computer-assisted instruction consists of presenting information, asking questions over what the student has just read and evaluating the student's responses. Imagine this program in BASIC.

```
10 PRINT "Which state is the
   largest";
20 INPUT A$
30 IF A$ = "ALASKA" THEN
   PRINT "Right."
40 IF A$ = "ALASCA" THEN
   PRINT "Right."
50 IF A$ = "ALLASKA" THEN
   PRINT "Right."
60 IF A$ = "TEXAS" THEN PRINT
   "No, only close."
```

Compare this with the easy to read E-Z PILOT version:

```
T: Which state is the largest
A:
M: ALASKA,ALASCA,ALLASKA
TY: Right.
M: Texas
TY: No, only close.
```

How elegant. How easy. How wonderful!!!!! Well, it is pretty nice. But, what's happening in the program? Well, the first statement asks a question and the second waits for an answer.

Statement #3 in the E-Z PILOT program simply says, "Match each successive answer on this line to the answer typed in by the student. IF you find a match, either exact or within their response, set a marker or flag called M. From that point on, any statement with a command followed by a Y will be executed. (That word, executed, has always bothered me when used regarding computers.

FLYING HIGH

Although, from time to time, I have wanted to execute my Apples.)

Actually, the Y flag stays set until the program ends *or* another M: statement is encountered. At that point, all bets are off and the flag is re-set depending on the result of the new match. Some PILOT's have very fancy match ability and allow you to ask for answers in a certain sequence, scrunch out spaces, have don't care characters, etc. Ours is very simple. It's there or it's not. No ifs, no buts.

Next time, we'll go into more conditional relationships and moving about within your program. You may want to look at the program called What am I? on the E-Z PILOT disk. That consists of nearly all T:, A: and M: statements. Don't worry about how to set the big letters or the few other statements.

In the third installment, we'll cover the many graphic possibilities inherent in E-Z PILOT. And, finally, we'll write a number of programs which do everything from telling Knock-Knock jokes to creating a small, simple adventure game.

P.S. There's also a talking version for Mockingboard owners! More on that later.

```
]LIST

5   REM

      SO WHAT DID YOU
        EXPECT

GARTH BAULCH : CALL
      -A.P.P.L.E.

10    POKE  - 16302,0:
        POKE  - 16297,0:
        TEXT : HOME :
20    VTAB 11: HTAB 8:
        PRINT "SO WHAT
        DID YOU EXPECT?"
30    POKE  - 16304,0
40  A =  NOT A
50    POKE  - 16303,0
60    GOTO 30
```


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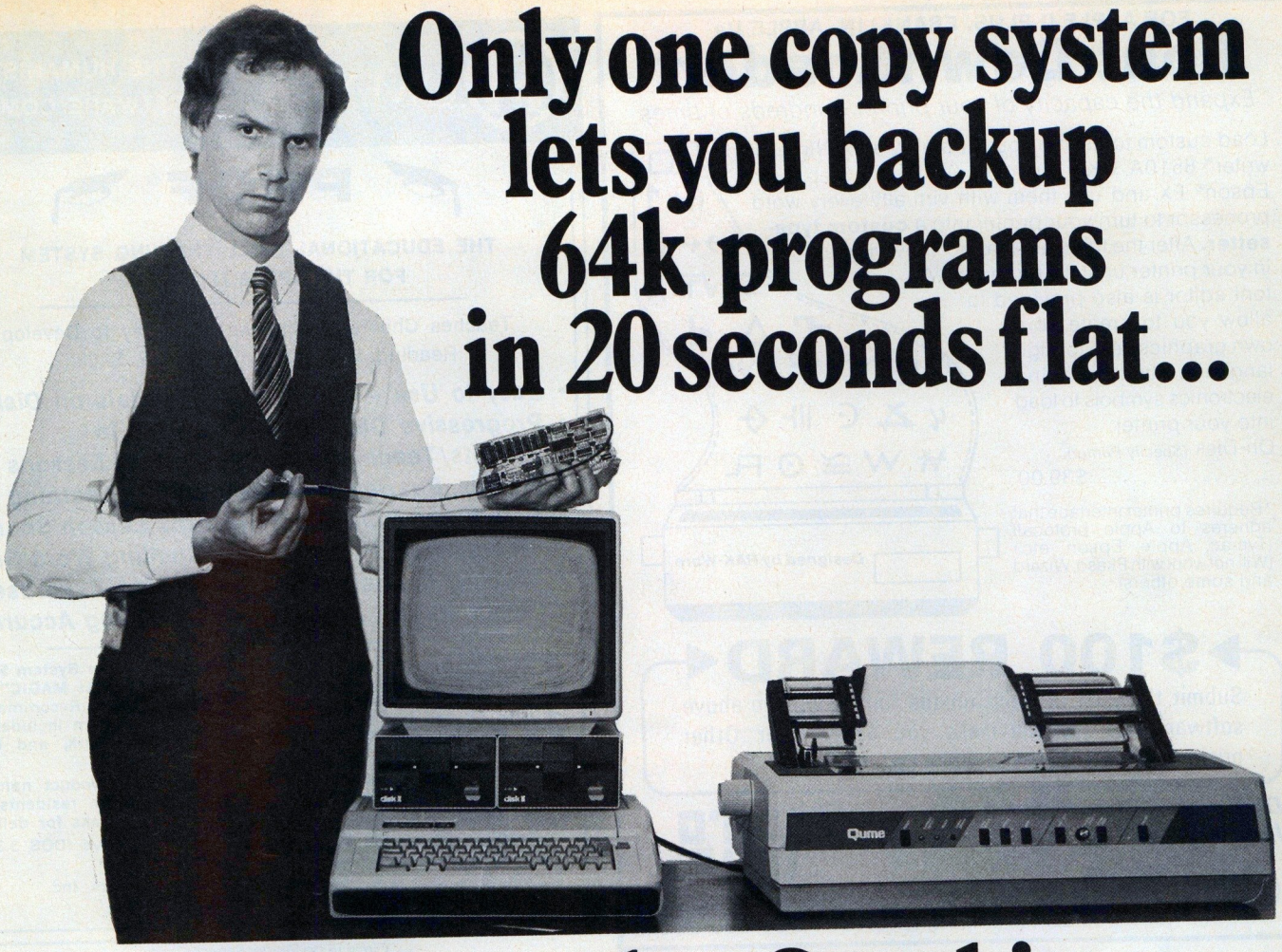

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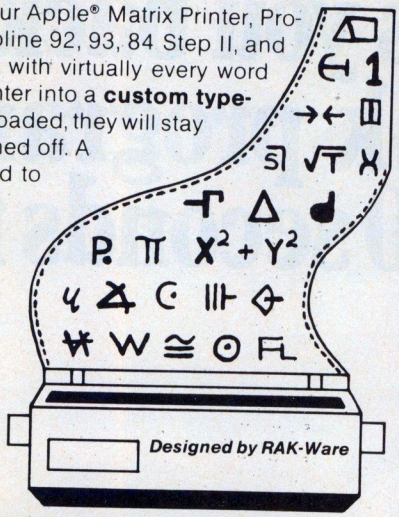

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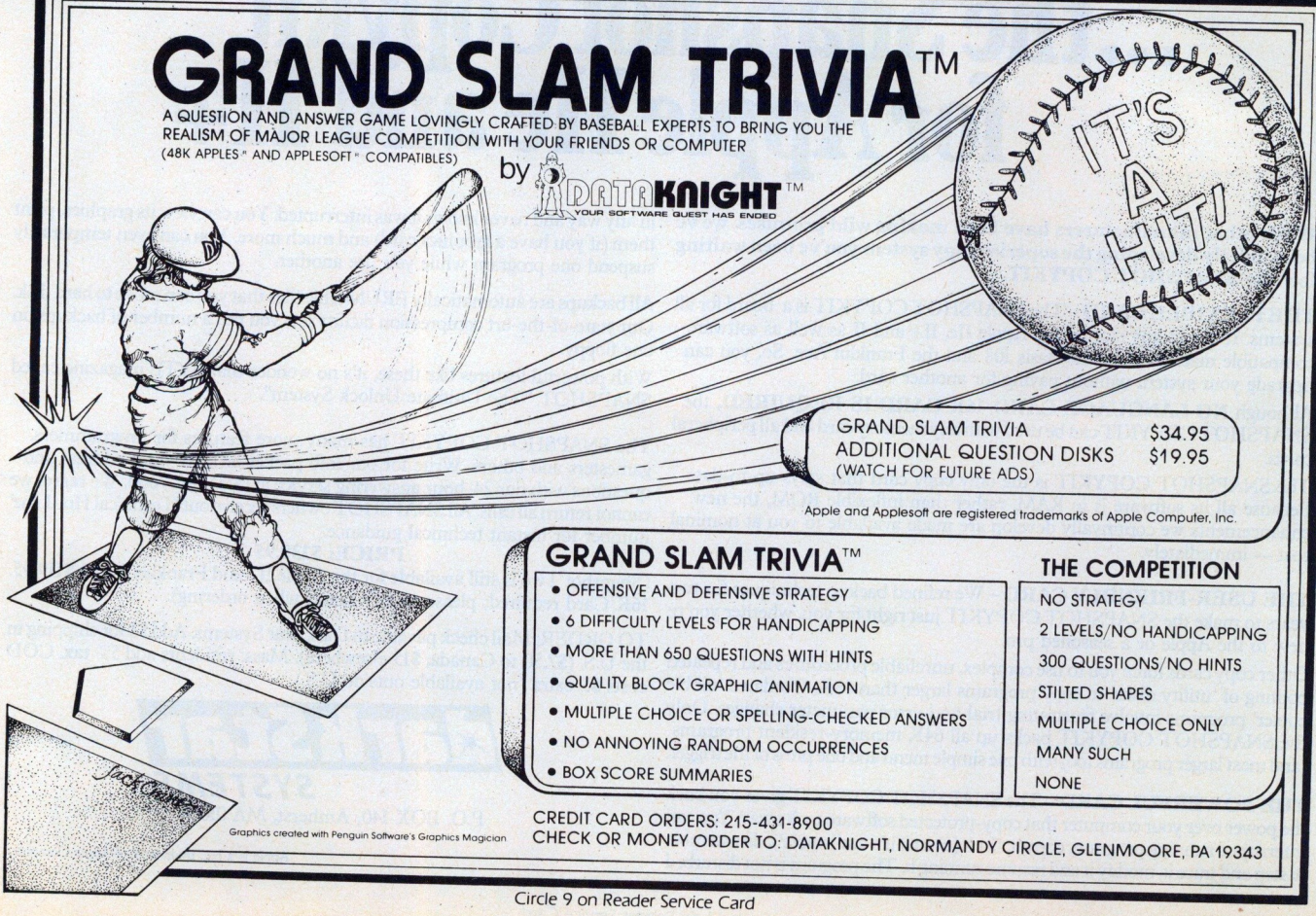

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CP/MAGIC:

WHY CP/M

Murray Arnow

THIS article is the first of a series of articles on the internal workings of the Microsoft version of Apple CP/M. Before getting into the nitty-gritty, it will be useful to review the philosophy behind CP/M.

CP/M is an operating system. It allows programs which have been written in 8080 machine code to run on any computer with an 8080 type microprocessor provided that certain well defined procedures are followed. This means that it is possible to write programs which are transportable between the myriad of microcomputers using 8080,8085 and Z-80 microprocessors.

The value of transportability is brought home if you have ever tried to run a machine language program written for the Atari on the Apple. Both computers use the 6502 microprocessor, but they have internal structures which are not compatible. For example, the routines needed to write a character to the monitor screen are totally different. A program which runs on Atari needs considerable modification to run on an Apple.

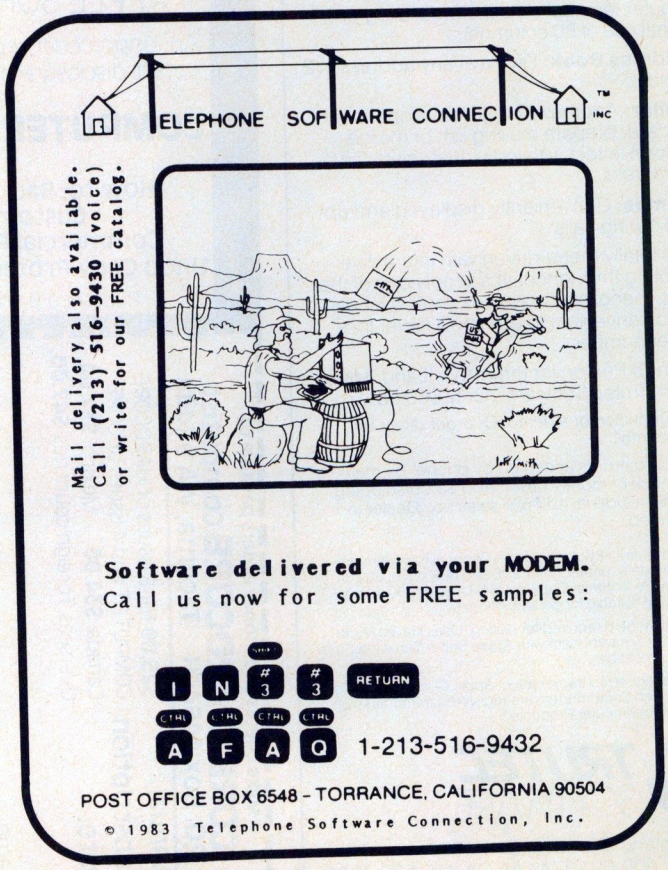
CP/M maintains transportability by providing the programmer with a set of procedures for receiving input from and sending output to physical devices. The procedures are implemented by what Digital Research calls the BDOS (basic disk operating system). Thus if you desire to read a file from the disk, all you need to do is initialize the Z-80 (or 8080) registers in a prescribed way and call the subroutine at memory location 0005H (the suffix H is used for the Softcard hexadecimal addresses). This is a slight simplification but it is essentially correct. Doing I/O to printers, consoles, disk drives, and even other computers is handled in a similar way.

At this time you may ask why is CP/M so special, and why did I have to sign a licensing agreement with Digital Research. CP/M is special in the way it structures the disk files and the disk directories. Without going into any detail, the files and directories are constructed in a way to minimize time of disk operations. Also, the disk operating system is constructed in a way which permits the relatively easy use of any type of disk drive or disk format. This is why a program such as WordStar will run on the Apple, Northstar, Kaypro, or any other CP/M compatible computer without modifying any of its disk routines. The most important reason for the licensing agreement is that Digital Research has the copyright on the operating system which has become the defacto standard for 8080 and Z-80 based computers.

All programs running under CP/M interface to the computer and the hardware through the BDOS. The BDOS is responsible for communicating directly with the native computer system. The BDOS and other software are provided by Digital Research when the CP/M package is purchased, but the user is responsible for interfacing the BDOS to his/her system.

There is a standard way by which the BDOS communicates with the computer; it is through a table of 17 jump vectors which point to routines for doing specified tasks. Digital Research defines where this jump table must be located and what tasks must be performed by these routines. It is then up to the user to provide the routines for his/her particular system. The assembly of user supplied routines is called the BIOS (basic input output system). The BDOS together with the BIOS is called the FDOS (full disk operating system).

The first commercially available Z-80 card for the Apple is distributed by Microsoft. The Microsoft Softcard comes with the Digital Research CP/M version 2.2 and a BIOS written by Microsoft. Since the documentation on the BIOS is by far more scarce than that for CP/M, I will devote upcoming articles on describing and modifying the BIOS. Next time around, I will focus specifically on printer interfacing.



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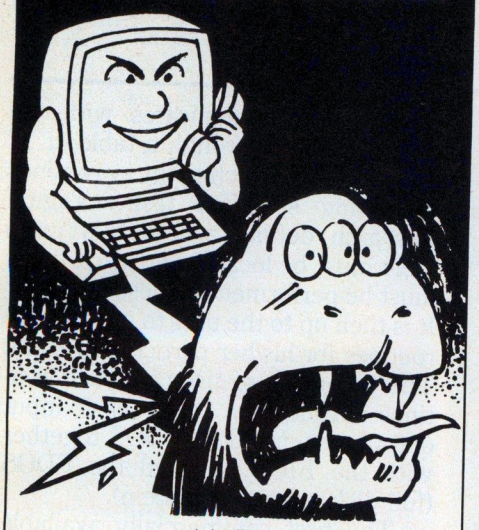

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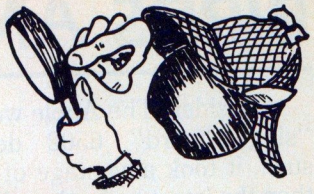

IT is actually standard procedure, you see. Once a fruit has become a commercial success, there are always attempts to hybridize it in order to provide some qualities which the original breeders of that particular variety considered to be of lesser importance, or were unable to obtain.

Thus, we have the many descendants of the venerable Jonathan and the numerous attempts to improve the popular MacIntosh. Thus too, we have dwarf root stock upon which buds of proven pears or apples are grafted, with the great savings in orchard space which this innovation brings. Home gardeners also keep things interesting by cultivating types which would never see the cold light of a supermarket produce aisle. We have, for instance, the succulent Transparent with its fabulous pie making qualities. Such a tender, poor-keeping fruit could never survive the careless commercial handling which some of the hardier varieties such as Granny Smith can take in stride.

Is there a perfect apple? Devotees of one variety would surely have an answer ready — but the real hackers among us are never satisfied, even if a lifetime be spent developing a single new cross, with no more to show for our work than a slightly improved coloring or a faster ripener.

Now in the silicon orchard, the situation is pretty much the same. One needs only to look around at the buds blossoming in the other corporate yards to determine whose is the most popular variety. Are you aware of any "clones" of the countless Commodore models, or of the gamey Ataris, or any particular one of the Z-80 machines? Exactly. And which ones *are* being imitated, cross-bred and hybridized? There are a few of the TRS family around, but with this single exception, virtually all attempts to copy or improve what someone else has done have centered on breeding the PC or the Apple][+.

I am convinced that this activity in the former case is due almost entirely to the name on the faceplate — let's face it folks, big mother blue is going on reputation alone in this market, their entry is neither "state-of-the-art," nor even very fast (good) at what it does do.

That could not possibly be said of the Apple Computer, however. Lacking pedigree or reputation, the][+ appeared on the scene full grown (just as a seedling of the three century old Fameuse variety once grew to bear us the MacIntosh as we now know it). As for the fruit for which it is named, acceptance of a new variety was slow at first, but the Apple is now firmly established as the most popular home computer in the North American market.

Success in its turn brings out two types of reaction: cooperative admiration and greedy jealousy. On the one hand we have the thousands of entrepreneurs who have honestly taken up the challenge implied by Apple in its publication of the operating system and hardware specifications. Their cooperation and enthusiasm have helped give Apple its present market domination and made money for all with any connection to the parent tree — including us! Thus, virtually every hardware or software add-on that one could conceive of for a computer of this type has been successfully marketed — often by several people at once.

On the other hand, that same kind of success means money, and the smell of dollars brings out the other kind of reaction — not so much admiration for the people who make those profits possible, but rather for the greenbacks themselves. They want a piece of the action, and while they are not sufficiently creative to bring out a wholly original product themselves, they are bright enough to copy the idea, and perhaps the designs, and perhaps the firmware, and perhaps the trademarks, and perhaps...

Well, you get the idea. We have all seen the results of this process in numerous advertisements for "copy-cat" Apples. The questions are: Is this sort of activity legal? Is it right? Has anything been accomplished for the consumer in all of this? Have any improvements really come about? What should we be buying? Where is this market heading?

To answer some of these questions, I tested several machines over a period of three to four weeks earlier in the year and made copious notes on their hardware, firmware, keyboards, ease of use, technological innovativeness, price, compatibility, and overall quality. A preliminary report on this work appeared in the September issue of "Vector" — the Journal of the British Columbia Association of Mathematics Teachers. What follows here is a more comprehensive examination than that short summary.

A chart at the end of this series provides a quick reference to my findings. It is important to note that the weight given to each factor mentioned will vary from one individual to another. The most difficult decision for you to make will come from your weighing of the legal and ethical issues involved. For me these are very important indeed, and I shall refer again to them, though I realize that some of you may not regard them as being particularly significant.

Let us begin by categorizing what is available. The original and genuine][+ we must place in a category by itself. All comparisons are made to it; for all practical purposes the plus must be regarded as having set the standard against which all the others must be rated. (I know, there was a two-not-plus, but that represents only a firmware distinction.) I have supervised the use of eight of these machines for the last three years at Mountain Secondary School, and have considerable experience with their advantages and their shortcomings. There are many of both.

—●→

BIRDS AND BEES

Consider: The Apple was the first "single-board" 6502 device. As such, it took advantage of what was then the latest technology to keep the chip count down, the manufacture and repair simple, and to provide for the maximum possible expandability.

As mentioned, publication of the monitor routines and all interface protocols guaranteed that those expansion slots would soon be filled by numerous peripheral controllers made by a variety of unrelated but equally energetic corporate partners.

The package was a relatively complete one with very few bugs in the firmware, and the bus protocol well thought out, and well built. The fact that the Apple has survived nearly unchanged all these years in an industry where knowledge and ideas can become obsolete overnight is testimony enough to the ingenuity of the original designers.

Moreover, the corporate policy of supporting peripheral manufacturers and software developers, as well as the end user, has paid off in a skyrocketing sales chart which has given this company one of the most phenomenal growth rates in North American corporate history. It is significant that Apple is the only one of the garage outfits to make it to the corporate big time — it is also interesting to note that some already huge companies got their collective fingers badly burned trying to enter this market themselves.

However, by 1982 the plus was showing its age, and its shortcomings had been well-enough documented that "improved" imitators had already appeared. The archaic keyboard, with its poor layout and lack of true lower case, combined with a dinky 40-column screen, made it a bad choice for word processing — a fatal flaw in an age when few serious writers any longer use a typewriter.

The 64K of memory, once thought more than adequate for a home machine, had now become a limiting factor, as ever larger applications were being devised. Also, competing machines had all this memory (and sometimes more) built in, rather than requiring some of it to be added by the user. Self-diagnostic routines were also becoming commonplace in the industry, and it had become evident that the three amp power supply was not adequate to handle all the chips on the main board as well as those which the more adventuresome were putting on peripheral cards.

It was past time for improvements and Apple and others knew it. More, the process was rushed along by Apple themselves when they attempted to cut off mail-order suppliers due to a perceived lack of commitment to service and price support. Within months, every one of those mail-order houses was offering some kind of Apple compatible machine, and more were being knocked together all the time. (There is a lesson in this: If you are going to police your market — and eventually you must — make sure you have the necessary muscle before you start.)

But despite its shortcomings — all correctable with add-ons — the][+ was still very popular, and deservedly so. Apple continues to make it (by special order in quantity) and the price has dropped some $500 to under $900 retail — if you can find any. At this price, I believe that it is still a better buy than any of the cheap imitations and worth serious consideration. But hurry; it won't be available for long.

Next time around, I'll go into details of the Apple "clones" and whether or not they are a good buy or a "good-bye".

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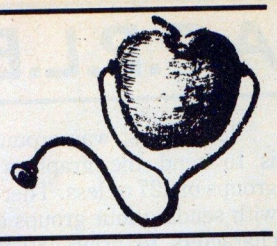


Bruce Field

A couple of months ago I had a question on producing subscripts and superscripts with the C. Itoh Prowriter printer. Thanks to Paul Demond and Jim Edwards for taking the time to answer my plea for help. Basically, the information in my answer was correct, however, in order to have the printer respond properly to the line feed character, the printer must first be placed in the Incremental Mode. The normal (default) mode is the Logic-Seek-Mode in which characters are stored in a print buffer. In this mode, it is not possible to execute a line feed without a carriage return. Reproduced below is a section of Applesoft code that demonstrates how to do this.

```
10  PRINT CHR$(4)"PR#1"
20  PRINT "THIS IS NORMAL ";
30  PRINT CHR$(27);CHR$(91);:
    REM SET INCREMENTAL
    MODE
40  PRINT CHR$(27);"T08";:
    REM LF = 8/144"
50  PRINT CHR$(10);:
    REM PRINT LINE FEED
60  PRINT "NOW SUBSCRIPT";
70  PRINT CHR$(27);CHR$(114);:
    REM REVERSE LINE FEED
80  PRINT CHR$(10);:
    REM PRINT LINE FEED
90  PRINT CHR$(27);"A";:
    REM 1/6" LINE FEED
100 PRINT CHR$(27);CHR$(102);:
    REM FORWARD LINE FEED
110 PRINT CHR$(27);CHR$(93);:
    REM SET LOGIC-SEEK-MODE
120 PRINT "AND BACK
    TO NORMAL"
130 PRINT CHR$(4)"PR#0"
```

This is actually very cumbersome and requires many control codes to be inserted if you are using a word processor. These extra codes often confuse the line formatter thus making the line too short. If you are using subscripts and superscripts in an equation that will be set out on a line by itself, there is a simpler way to do this.

Assume, for example, you have an equation with only subscripts, type the equation in leaving spaces wherever subscripts belong. At the end of the line, put the proper control sequence to command the printer to produce a half line feed. On the next line, space over and line the subscripts up under the spaces left in the line above. The printer will make two passes to print the line, but will still probably be faster than moving the platen up and down. Using this method, backlash in the platen gears will not produce the uneven lines which happen when the platen is moved up and down.

Question:

I use an NEC 8023 printer and Pkaso interface with Screenwriter II. There are three operations that I have been unable to perform using Screenwriter. First, I would like to print characters such as subscripts from the Pkaso Special Character Set. Secondly, I would like to be able to change back and forth among the various 8023 font types in the middle of a Screenwriter file. Using the control characters indicated in the 8023 manual, I have managed to print one full line in a font other than Pica. Beginning with the second line, the font reverts to Pica. Thirdly, I would like to be able to use the Pause command to print subscripts in scientific documents. If I embed a pause command in the middle of a line, printing will stop at the beginning of the line; pressing the space bar causes the entire line to be printed.

I would appreciate any solutions to these problems.

Answer:

By a funny coincidence, it is possible to run the Pkaso special characters from within Screenwriter if your text file is not too big. Pkaso recommends that you start your characters file at location $8800. Thus all you have to do from within Screenwriter is [Ctrl-D] BRUN SPECIAL CHARS.8HI,A$8800.

When the Pkaso board is used it does funny things to the printer, so to change back and forth between the character sizes of the printer, you should ignore the printer manual codes and instead use the codes in the Pkaso manual. To change the character size, the codes to be sent are [Ctrl-I]NF. Where N is one of the numbers below.

3 to 40 — 5 char/inch
41 to 48 — 6 char/inch
49 to 68 — 8.5 char/inch
69 to 80 — 10 char/inch
81 to 96 — 12 char/inch
97 to 255 — 17 char/inch

To print subscripts or superscripts, see the question above as the 8023 behaves the same as the Prowriter printer. The reason that the pause command stops at the beginning of a line is because the Pkaso card has sent all the previous characters in the line to the printer and then pauses. But, the printer is saving all the characters in a buffer until it receives a carriage return, so it has printed nothing. If you put the printer in the Incremental-Mode (described above), it will pause at the proper time.

Question:

I have a Tymac PPC-100 interface and Epson MX-80 printer with Graftrax Plus chips. The problem involves the Apple CPU's inability to send out 8 bits to the printer, i.e. values over 127. I want to print up to 8" of graphic data, 7 dots (pins) high by up to 480 dots wide on my MX-80. The problem is that when I ask for help concerning graphics, just about everybody I talk to is fixed on the idea of High-Res screen dump. I want to address the pins directly which would allow me to print out graphic information with about four times the resolution of the High-Res screen and to the exact size I want.

Answer:

From the program listings you sent me, I can see that in order to print in the graphics mode on the printer you need to send an ESC character followed by the letter "K" followed by two bytes that are the number of graphics columns you want to print.

The problem is that together the two bytes form a 16-bit number and must be sent in hex (or binary, as opposed to ASCII) to the printer. To do this you need to be able to send all possible values from 0 to 255. The Apple's CPU is perfectly willing to do this, the problem is with the interface card, or more specifically the combination of interface card and printer.

The Epson printer contains two sets of "characters," values from 0 to 127 produce the standard ASCII character set while values from 128 to 255 produce a set of Low-Res block graphics characters. The Apple generally (but not always) outputs characters to the printer with the eighth bit set, thus if these characters were sent to the printer, you would get nothing but the block graphics. Interface cards get around this problem by having a soft switch to control whether the eighth bit is set or not, or sometimes (and this is true of the Epson parallel interface) the interface is permanently wired with the eighth bit turned off.

A.P.P.L.E. DOCTOR

The easiest way around this problem is to send the graphics characters in groups of 127 or less. There is no problem with sending four groups of 120 graphics characters to print 480 dots on a line. Simply suppress any carriage return (by putting a ";" at the end of Applesoft print statements) until all four groups have been printed.

Your examples also show another effect that can be traced to the interface card. Most interface cards provide margin control, which means if the line is greater than a specified number of columns, the interface issues a carriage return, line feed, and enough blanks to position the printer head on the next line. With the printer expecting bit-image graphics, these characters are interpreted as dot patterns and produce weird patterns in the middle of the desired patterns. You should send the proper command to your interface card before sending the graphics to turn off any margin control. One popular method is to print the character sequence [Ctrl-I]0N, which from Applesoft looks like PRINT CHR$(9)"0N".

Not to discourage you, but there may also be an additional problem. When you send bit-image graphics characters to the printer, you need to be able to send all the characters from 0 to 255 (or 0 to 127 for seven bits). Interface cards often use certain control characters — usually [Ctrl-I], decimal code 9 — to initiate formatting functions. These characters are trapped by the interface card and not sent to the printer. To get around this problem, you may need to bypass the software on the interface card, that is not PRINT the characters but rather POKE the values directly into the memory location that outputs to the printer. The actual memory location will depend on your particular interface card and which slot contains the card. An example of how to do this for the Apple parallel interface card is given in the Epson manual.

Question:

Does anyone know of a workable patch for a RAM based Autostart monitor to allow clock interrupts without crashing the DOS page 0 location $45?

Answer:

With the monitor on the RAM card, you can patch FA41:0. The IRQ handler will then store the accumulator at location zero. Note that immediately prior to executing an RTI, the accumulator must be loaded from location zero rather than $45 as is usual. This will also work for the new monitor in the Apple *IIe*.

Question:

I have an Apple][+ with a Saturn 128K RAM card in slot 0, and my Integer card in slot 4. When I am doing my own work, it works fine there. However, some software gets hung up with the Integer card in slot 4, and I don't know why or what to do about it. Visicalc occasionally does not work with it there. Falcons gets hung up, as does Applewriter. Do you have an idea what is going wrong?

Answer:

I have only a couple of vague clues as to what may be happening. Most likely it is not directly related to the Integer card in slot 4, but the lack of an image of the monitor in the Saturn card. Should the card inadvertently get turned on and the monitor is not present, the system could hang when a monitor subroutine is called. I would certainly try removing the Integer card for a little while and see if the problem still occurs.

There may also be a conflict between the two cards during the RESET procedure. If the switch on the back of the Integer card is in the up position when reset is pressed, the Integer card will turn itself on even if it had previously been off. It is possible that the Saturn card may have been turned on and wants to remain on. The computer will probably hang if both cards are turned on at the same time. If this is the case, make sure that the switch on the Integer card is in the down position.

Unfortunately, there is probably not much you can do about this problem with protected programs. However, you might try booting the protected program by typing "FP" (to make sure you are in Applesoft, then "PR#6." This will insure you are booting to the main board language. I have had no problem using Applewriter 1 and 2 with a 16K RAM card and the Integer card in slot 2. Perhaps there is something unique about the Saturn card, you might give the manufacturer a call.

Question:

How can I trick the DC Hayes Micromodem into transmitting and receiving lower case?

Answer:

The Micromodem will normally transmit lower case. If you have an Apple *IIe* simply release the caps lock key. On an Apple][or][+ the software that you use to send characters to the modem needs to be set to send lower case letters. When receiving characters, the Micromodem normally converts lower case to upper case. To defeat this,

POKE 1784 + slot number,0.

To return to upper case only,

POKE 1784 + slot number,32.

Where slot number is the number of the slot (1-7) containing the Micromodem.

Question:

I understand that there is a so-called "signature byte" in the Apple that a program can interrogate to tell whether the program is running on an Apple][,][+, or IIe. Do you know what this byte is?

Answer:

Apple has designated the byte at memory address $FBB3 as a signature byte. This byte resides in the monitor ROM and each revision of the Apple will have a unique value. From Applesoft, the value of this byte can be obtained by PEEK(-1101) where the value for an Apple][(original monitor ROM) is 56 decimal, for an Apple][+ (Autostart ROM), 234, and for the *IIe*, 6.

It is also possible to tell whether the *IIe* has the Apple 80 column card plugged into the auxiliary slot by running the short machine language routine listed below. A standard 80 column card plugged into slot 3 will not be detected by this routine.

```
300:AD 1C C0 0A A9 88 2C 18
308:C0 8D 01 C0 08 78 08 8D
310:55 C0 AC 00 04 8D 00 04
318:AD 00 04 8C 00 04 28 B0
320:03 8D 54 C0 30 03 8D 00
328:C0 28 AO 00 C9 88 D0 01
330:C8 84 00 60
```

If the 80 column card is present, memory location 0 will contain a 1; if not, location 0 will be 0. This routine, "borrowed" from the Apple *IIe* monitor ROM, is totally relocatable, and although it is shown starting at location $300, it may be run anywhere in memory except in the text page memory ($400-$7FF).

Question:

I am confused on a matter concerning Apple Disk Drives. The problem — do you or do you not clean the head in a disk drive? I have heard opinions from several people, which vary from "Never!" to "Certainly, at least every X hours." The answer has even been qualified by concern for which brand disk has been used. Additionally, if the answer is yes, what about self-cleaning disks vs. hand-applied solutions?

(continued on page 68)

ROBOTIC SERIES:

THE MONSTER LIVES

Michael Thyng

ON Saturday, May 29, 1983 at 5:15 P.M. MIRT the robot (which stands for Mobile Indoor Robotic Toy — my own descriptive acronym) rolled its first few inches under computer control. Now that's exciting! On the weekend of June 11th and 12th of 1983, at the 2nd annual A.P.P.L.E. Festival at the Pacific Science Center, the robot made its debut.

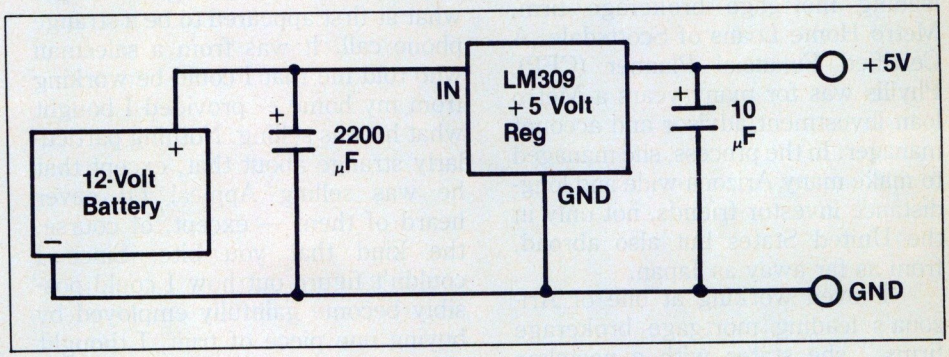
This project started a little over a year ago at the first annual A.P.P.L.E. Festival. There were no robots. I thought it would be appropos to have one and decided to build it myself. I started planning and described the process in a series of articles that have been published in *Call -A.P.P.L.E.*

Enough history. The hardest part was getting started. Like anything that seems ominously large, visualizing the steps needed to bring it to completion is a chore. The second hardest part is the actual finishing; completing that last five or ten percent.

If it seems that starting and finishing is all encompassing, forgive me. Truthfully, it simply takes a great deal of effort to get the project under way. Once going, it gains momentum, especially when you start building the superstructure that gives it shape. It is so easy to make progress when you can see the results of your work.

A couple of months before I completed the robot, all the individual components had been working on the test bench — as individual components always do. Making the robot work with all the components installed and run by its own power supply was yet another matter. There were the normal problems that are predictable: missing a ground, not pulling the signal up to TTL levels when necessary and so on. Once I had the individual components working on the test bench, I knew the robot would work. I could control the motors and, therefore, its direction. Why bother putting it all together? This was the hardest stage for me to complete, and something I hadn't expected to experience.

Let's talk technically now for those of you who have written in and have told me you are building a robot. I originally planned on using two 12-volt motorcycle batteries, with the idea of isolating the microprocessor and electronics circuits from the motors, relays, and power circuits. I had been overly sensitized to the need for isolation. You will find that motorcycle battery prices are pretty high (25 to 95 dollars). I consequently ended up using one 14 amp-hour 12-volt battery and stepping the voltage down to 5 volts for the electronics with a 7805 voltage regulator. It works very well.



For those of you who have asked about which microprocessor to use, I would recommend that you buy something which recognizes the 6502 instruction set. That way, you can do your development work on your Apple and then transfer the program or data to your robot where it will be directly recognizable. I would recommend the Vic-20 or the Commodore 64 as first choices. In Seattle, summer of '83, the Commodore 64 is selling for a little under $200. In 1976 when I bought the microcomputer I'm using on MIRT, it cost me $245. That was for 1.1K memory. If you were willing to trade time for dollars, consider using the Timex-Sinclair. It's small, light and available. *But*... it's not a 6502. You will have a tougher time interfacing the motor controls to it than to the Vic.

Right now, MIRT has the capability of moving forward, backward, right, left, spinning on its own axis either way and pausing. MIRT only follows directions — much like the Milton-Bradley BIG TRAK. It doesn't make any decisions and doesn't have any input sensors to provide feedback to the microprocessor. I don't want a slave, I want a machine that "thinks" for itself and makes decisions. My next step involved installing the input sensors, with myself working on the arm. It should be ready by the end of the year.

Many of you have written in to ask if I had thought of providing "speech" for MIRT. Yes, I've thought of it, but the cost of the materials and the time involved in installing it doesn't seem to be a reasonable trade-off. I do have a speech synthesizer hooked up to my Apple][, and early next year I'll install a radio link to transmit data between the Apple][and MIRT. That way MIRT can detect something with the electronics it has on-board and transmit the data to the Apple for analysis.

Next time: Photos, diagrams, circuits, and bill of materials.

DISEASE WAS HER KEY TO SUCCESS

Michael Shadick

IT isn't likely that a serious physical infirmity such as multiple sclerosis (MS), could serve to actually improve one's lot in life.

But then, nothing is really unlikely in the computer age!

In the case of one Ms. Phyllis Duwelius, it's not only likely that MS has opened new doors for her; it's a fact of life.

Though she is far from fully crippled by the disease, Phyllis found it to be an increasingly severe hindrance to her work. Or, more precisely, an "impediment" to her getting back and forth from her home to her work.

So where did Ms. Duwelius hang her professional hat? At Arizona's leading mortgage brokerage firm, Metro Home Loans of Scottsdale. A Certified Financial Planner (CFP), Phyllis was for many years a Metro loan investment advisor and account manager. In the process, she managed to make many Arizona-wide and long-distance investor friends, not only in the United States but also abroad, from as far away as Japan.

"I loved working at one of Arizona's leading mortgage brokerage firms," she states with a nostalgic twinge. "But I found my physical mobility to be hindered so much, that to fight traffic in the morning was a real pain, quite literally, and to drive home each night was a genuine ordeal."

Faced with no prospects of a swift recovery from MS, Phyllis last October reluctantly tendered her resignation at Metro.

It was just as reluctantly accepted.

Now she faced what at first appeared to be almost as grim of a prospect: namely, being a semi-invalid for the rest of her life. Almost excruciatingly sound in mind, her psyche was "entrapped" in a body too frail for Phyllis to seek any employment outside her home.

"About a week after I left Metro," Phyllis recalls with a grin, "I got what at first appeared to be a strange phone call. It was from a salesman who told me that I could be working from my home — provided I bought what he was selling. Nothing particularly strange about that, except that he was selling Apples! I'd never heard of them — except, of course, the kind that you bite. Since I couldn't figure out how I could possibly become gainfully employed by buying one piece of fruit, I thought that the salesman must be some sort of nut! But when I began to understand that what he was talking about was a computer, I became a bit more interested. The rest is — well, Apple history!"

And financial history, as well. For Phyllis soon realized that an Apple could allow her to do much the same sort of investment counseling and managing as she had been doing at Metro. Indeed, it appeared that an Apple could help her do it even better!

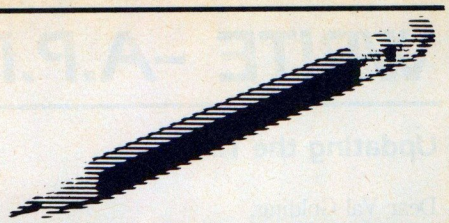
"I frankly couldn't believe my eyes," she states with enthusiasm, recalling her introduction to the Apple][. "Here I was doing word processing, and financial forecasting, and mailing list updating, all in my own home! Perhaps needless to say, once that Apple came into my home, it never left. It's now mine — and I love it!"

Of all the work that Phyllis' Apple][is now helping her with (and she glories in the fact that she's only just begun to scratch the surface!), she is most impressed by the financial forecasting capabilities of her VisiCalc program. "When I first viewed the spreadsheet, and the investment projections that it enabled me to make," she states, "it fairly boggled my mind! Now I use it every day. Frankly, I don't believe that I could get along without it. Neither do my clients. Just imagine, only a few short months ago I never dreamed that I'd ever be able to do this work again!"

Among Ms. Duwelius' clients are many investors with whom she worked while at Metro. Yet, there are many new clients, as well. "My Apple has opened up a whole new world to me, "Phyllis states without exaggeration. "And who'd have even guessed that I'd discover it at home!"

Though Phyllis certainly does not consider her MS infirmity to be a blessing, neither does she perceive it to be a curse. Far from it! For the new avenues of endeavor and opportunity which are now opening to her every day, are the very avenues which would probably have otherwise remained closed to her forever. "Without the disease," she states with characteristic candor, "I probably wouldn't be discovering what micro-computing can do for me. In my case then, an Apple can't keep the doctor away — but it sure keeps the wolf from my door. And then some!"

In terms of what Ms. Duwelius sees in store for her and her Apple in the future, she likes to quote from a popular song by one of her folk heros, the late great Karen Carpenter: "We've only just begun!"



Spread Sheet Printer Codes

Call –A.P.P.L.E.

BASED on Steve Ross's article on Spreadsheet programs in the June issue, I bought SPREADSHEET 2.0. This is my first spreadsheet experience. I have found the program easy to learn and most of my questions are readily answered in the documentation. One large problem seemed to crop up. The directions for entering the printer setup string state that the escape codes needed to setup a C–ITOH printer can not be entered. While in theory one should be able to set the printer codes before booting the program, we all know that this is hard to do. Well, I have a method which seems to do the job. I enter a control "G" as the first character in the string, followed by the appropriate escape codes. This rings the printer bell and also selects the desired print mode. I hope that this helps out anyone else that has a tough time remembering to do the setup first.

Robert Van der Cook
525 Riverside Dr.
West Richland, WA 99352

Comment Without Comment

Dear Editor,

Please keep *Call –A.P.P.L.E.* an Apple magazine; don't print articles about those look–alike machines like the Orange, Ace, etc. Let the owners of those also-ran machines start their own clubs and print their own newsletters. If they want to buy inferior copies, that's their business, but the Apple club is a cult. If they want to join, they can certainly buy an Apple like the rest of us!

Tod Wicks
3378 Wavsley St.
Palo Alto, CA 94306

Apple Writer/Okidata Help

Call –A.P.P.L.E.

Thanks to an individual from Apple Computer Corporation, all my problems are resolved regarding *Apple Writer* and my printer.

If you've ever been unsuccessful in trying to use the full print capabilities of your printer when using *Apple Writer,* then you'll be interested in this easy solution. It doesn't even matter what kind of printer you have... and you don't even have to know what keyboard entry creates the values. Here is all you need to do:

Enter the following Applesoft program to create a special "glossary" file which will be referenced by *Apple Writer. Note:* Lines 60–80 contain the printer command values for an OKIDATA 82A printer. Substitute these values with *your* printer command values.

```
10  REM SINCE MY PRINTER IS
    AN OKIDATA, I WILL
    CREATE A FILE CALLED
    OKIFILE
20  REM THIS FILE WILL
    ACTUALLY BE THE
    GLOSSARY THAT I USE IN
    APPLE WRITER
30  D$ = CHR$(4)
40  PRINT D$;"OPEN OKIFILE"
50  PRINT D$;"WRITE OKIFILE"
60  PRINT CHR$(119);CHR$(31):
    REM 119 = w AND 31 IS
    THE CONTROL CHARACTER
    THAT REPRESENTS WIDE
    PRINT FOR MY PRINTER
70  PRINT CHR$(99);CHR$(29):
    REM 99 = c AND 29 IS THE
    CONTROL CHARACTER THAT
    PRODUCES CONDENSED
    PRINT FOR MY PRINTER
80  PRINT CHR$(110);CHR$(30):
    REM 110 = n AND 30 IS
    THE CONTROL CHARACTER
    THAT REPRESENTS
    NORMAL 10 CPI
90  PRINT D$;"CLOSE OKIFILE"
95  END
```

That's it for the program. Now run it by entering RUN and allow the output file to be written to your *Apple Writer* master disk (or a temporary work disk if you want to make sure everything is setup right).

Next boot up your *Apple Writer* disk.

When *Apple Writer* is ready for you to use, then request your glossary file to be loaded by entering [Ctrl–Q] 5.

You will be prompted for a file name. Insert the disk that contains the output from the above program. Next, enter the file name of your glossary file. (In my case, I would enter OKIFILE in response to the prompt.)

That's it. Now you are ready to go. If you want a word to appear in wide print, then all you have to do is this: [Ctrl–G]w

Follow this immediately with the word that should appear as wide print.

After your word or words have been entered, input [Ctrl–G]n to reset the print to the normal setting of 10 cpi.

NOTE: "w," "n," and "c" are defined as the first character in the print statements (lines 60 - 80) of the above Applesoft program. These could be equal to anything you wanted to setup that would be meaningful to you. "w" was easy for me to equate to wide print, "n" represents normal and "c" represents condensed print, etc.

Therefore, [Ctrl–G]wSample[Ctrl–G]n will produce **Sample**

To me, this solution is worth its weight in gold. I hope it will be as useful to others as it has been to me.

Connie Kouba
7315 Stewart Drive
Eden Prairie, MN

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WRITE -A.P.P.L.E.

Updating the Time

Dear Val Golding,

I feel that a little additional information concerning my article: "CATALOG CLOCK" (Aug 83) and "THE TIME IS NOW..." by Peter D. Hipson might be of interest. If you want to read the time on the Thunderclock in Mountain Computer Apple Clock format, the articles above don't work. According to a new Thunderclock manual that I received after writing the article, on page 4-2 "...you must write a $00 to one of the peripheral slot scratchpad memory addresses immediately before calling the READ entry point. This address is $5F8+N, where N is the slot number of your THUNDERCLOCK. Here's an example for a THUNDERCLOCK in slot 4:

```
LDY #4          THUNDERCLOCK
                SLOT #
LDA #0
STA $5F8,Y      SET MHC FORMAT
JSR RDTCP       PUT TIME IN
                BUFFER
```

Upon return from the READ, call the time string in Mountain Computer format which will be in the GETLN buffer starting at $200."

To make DOS TIME work, insert three lines just above line 199 in the source listing. They are:

```
LDY #7          ot #
LDA #0
STA $5F8,Y      as above
```

To use Mountain Computer format in the CATALOG CLOCK, you may have some difficulty without relocating the final resting place for the routine (the present listing locates within DOS). I preferred the THUNDERCLOCK format for the CATALOG CLOCK routine but just add the above three lines and relocate the routine. For those who have the Apple *IIe*, I have heard that the free space within DOS is more limited than before and the space at $BA69 is not available. Therefore, you *must* relocate CATALOG CLOCK or DOS will surprise you with unpredictable results. If you don't want to relocate, just get a copy of the older version (][plus) of DOS 3.3 which also runs fine on the *IIe*.

I hope the above information clears up some questions that some members may have.

David Kelly
1705 Tiffany Pl.
Ontario, CA 91761

Center Your Diskettes

Dear Val:

I have been working with the Apple][computer for over three years as a professional system developer. In the course of my work, I have tracked down the major cause of "disk I/O errors" which plague the computer user and have a simple technique to eliminate them.

We have found that the simple operation of inserting a disk in the disk drive is the cause of many disk crashes and I/O errors. We have all read in the Apple DOS manual to "*Never* open the disk drive door when the IN USE light is on. This may permanently destroy the diskette, and is almost sure to destroy the information on it (DOS manual, p.7)." This juicy little warning has been interpreted to mean "never open *or close* the disk drive door..."

The most common cause of a disk crash is poor centering or seating of the disk hub in the disk drive clamp. This problem can be *completely eliminated* if you simply insert the disk, leaving the door open, and then start the program (or whatever else you need to do to get the disk to run). When the "in use" LED comes on, gently close the drive door. This effectively guarantees the disk will be properly centered in the drive by the spinning bug centering mechanism. This process should also be used when INITializing a disk, when reading data from a disk, or when booting from a disk. Once the disk is properly centered in the drive, it will remain so until removed.

For the technical minded, there is *absolutely no danger* of damaging a disk if you follow this procedure, contrary to the warning in the DOS manual. DOS will not write a sector of data to the disk until it has read the sector address header, which it can't read until you close the door. Likewise, DOS will keep trying to read a sector from the disk for much longer than it takes to close the drive door.

To extend this concept further, if the disk recalibrates while reading a file, you can even open and close the door quickly with no danger of causing problems, and with a good chance of correcting one before the program crashes with an I/O error.

It is only when you are writing to a disk that the real danger exists. Because of the complex operations that DOS goes through when writing a file, it is possible to damage a disk if you open it while a file is being written. Usually, the only damage would be to the file being written. In this case, use FID or Super Disk Copy to copy the undamaged files to a new disk, and try to repair the damaged file with Bag of Tricks or some other disk Zap utility.

We have used this technique "in house" for over two years, and have taught this procedure to all of our customers and friends, as well. It works, folks! I haven't had a disk I/O failure in so long, I can't remember it!

Eric C. Anderson
Executive Vice President
Clear Light Inc.
1500 Gateway Drive
Ft. Lauderdale, FL 33309

A.P.P.L.E. DOCTOR

continued from page 64

Answer:

As you are aware, there are as many opinions as there are people and very little hard evidence. As a disk drive is used, oxide and dirt particles from the diskettes tend to build up on the head. In time, this rubbish can cause problems in reading and writing to diskettes. Therefore, periodic cleaning seems like a good idea. The problem is how often. This will, of course, depend on how much you use your disk drive and how dirty your environment is. I personally feel that cleaning the drives every couple of years is not unreasonable.

Regarding the self-cleaning disks, these disks work by abrading the particles from the head, often with the help of a solvent.

Although the manufacturers claim they do not damage the head, it would seem that some wear could occur.

My solution is to disassemble the drive (remove the four screws on the bottom of the case and slide the drive out of the case), and then use a cotton swab moistened with rubbing alcohol to clean the head.

TOMORROW'S APPLES TODAY

Kevin O. Donohoe/editor

NOTE: These products are presumed to be state-of-the-art. Call -A.P.P.L.E. does not necessarily endorse products published in this column as we have not tested them.

THIRD WIZARDRY SCENARIO WITH "WINDO-WIZARDRY"

One of the innovative leaders in Apple-compatible computer software has introduced a dramatic new concept in window graphics to the rapidly changing consumer marketplace. Sir-Tech Software, Inc. has unveiled its WINDO-WIZARDRY™ high-resolution display manager for the Apple][through its latest Wizardry recreational program called "Legacy of Llylgamyn."

Sir-Tech Marketing Director Robert Sirotek explains, "Instead of treating the TV screen as a flat matrix of dots, WINDO-WIZARDRY™ allows our programmers to create and manipulate rectangular windows, areas of any size, inside which text and graphics can be placed." Each window has several attributes which allow WINDO-WIZARDRY™ to generate and maintain an image on the screen. These include the window's size, position and priority. When windows overlap (that is, want to use the same area of the screen), the window with the higher priority is visible while lower priority windows are hidden "behind" it.

WINDO-WIZARDRY™ has been incorporated into the third scenario of Sir-Tech's "WIZARDRY" fantasy role-playing program authored by Andrew Greenberg and Robert Woodhead. The third scenario is titled "Legacy of Llylgamyn" and was preceded by "Knight of Diamonds." The first scenario, "Wizardry — Proving Grounds of the Mad Overlord," was voted the all-time favorite software program in a reader's poll conducted by *Softalk Magazine.*

The Wizardry fantasy software series is famous for its depth of play and three-dimensional maze. Legacy of Llylgamyn is a masterful blend of storyline and computer software innovation. The adversary characters throughout the program are in dramatic, vivid full-color. Gone are the days of being trapped inside the two dimensional world of a CRT screen. WINDO-WIZARDRY™ propels you into the 3-D world of Wizardry by allowing full screen maze displays with super-imposed display windows which help the player become more engrossed in the game.

The adventure of the Wizardry game series has been a national success because it allows the player to enter a world of personal fantasy. Success has been drawn from its fully unique qualities: flexibility in building characters, designating strengths and weaknesses that have clear effects in the game, and allowing up to six characters at a time into a dungeon where they interact and work as a team to overcome monsters and obstacles.

For more information contact Joseph J. Lamachia, P.O. Box 686, Liverpool, NY 13088, (315) 451-4434.

APPLE COMPUTER NOW USEABLE BY VISUALLY IMPAIRED

Most Apple computers can now be used by people who have serious visual impairments, even legal blindness, with the help of a new large print "display processor" announced by a Santa Monica firm. The product, designated the Model DP-10, manufactured by Visualtek, Inc., plugs into the Apple][, Apple][+, or Apple *IIe* as a peripheral device, but automatically (without operator intervention or special programming) enlarges the displayed letters up to 16 times their original size.

The popular Apple computers, of which an estimated 700,000 are in use, are not generally useable by people with serious visual impairments, because the characters displayed on the video screen are much too small to be viewed clearly by the visually impaired. This problem is especially serious in public schools, a major market segment for Apple, where partially sighted youngsters "mainstreamed" in the classroom are unable to receive computer training as do their peers.

The DP-10 is a small electronic device that works in a completely passive or "transparent" manner. No software is required; therefore, almost all Apple software can be used without alteration. This gives the partially sighted, or legally blind user the ability to function at equal levels of efficiency like a fully sighted person. Whether the Apple is being used in the home, in a small business, in a school, or as a terminal to a larger host computer, the same programs can be used regardless of the user's visual capabilities.

For additional information contact James McCarthy, 1610 - 26th Street, Santa Monica, CA 90404, (213) 829-3969.

ADDRESS/ INFORMATION FOR BEGINNERS

ARTSCI, Inc. announces the release of Magic Memory, a directory/data base system that can be operated by the first time computer user.

Magic Memory's screen resembles an address book, with tabs designations lettered entries ("A," "B," "C," etc...). This allows names, addresses and phone numbers to be stored, deleted and transferred in an instant. Magic Memory also has the ability to print out a complete address book.

For further information, contact Ed Roth, ARTSCI Inc., 5547 Satsuma Avenue, North Hollywood, CA 91601, (213) 501-4179.

CHARTS UNLIMITED OFFERS CAD CAPABILITIES FOR APPLE USERS

Charts Unlimited is a new software product that offers many computer aided drawing features normally found only on systems costing $20,000 - $40,000. This new $195 software package will run on any Apple *IIe* or Apple][+ with 64K.

Charts Unlimited lets users define their own objects. The package starts with 36 predefined objects and 36 predefined symbols. But users can create their own "alternate" objects — up to 26 in one file, and there's no limit on the number of files.

Charts Unlimited is easy to use to draw flowcharts, floor plans, organization charts, engineering drawings, electrical schematics, forms, PERT charts and virtually any type of chart. Charts created can be quickly changed, rearranged, enlarged, replicated or overlayed onto other charts.

Charts or drawings are created on a worksheet grid of 123 columns by 90 rows (same size as standard 8½ by 11 sheet of paper). Users can mix text with graphics anywhere on the worksheet. Text isn't limited to upper case, either. Users can pick lower case or bold.

For more information, contact your nearest dealer or Charts Unlimited, 5084 Mosiman Road, Middletown, OH 45042, (513) 424-6733.

TOMORROW'S APPLES TODAY

FORTH AT YOUR FINGERTIPS FREE FORTH REFERENCE CARD AVAILABLE

The "FORTH Handy Reference Card" is now available free from the FORTH Interest Group (FIG). Functioning as a pocket programming aid, the card lists and describes the major commands of the FORTH computer language. This card serves as an excellent reference for all FORTH programmers — beginner to expert. Commands are grouped by function for easy reference and use. These include: stack manipulations, number bases, arithmetic and logical, comparison, memory, control structures, terminal input-output, input-output formatting, disk handling, defining words, vocabularies, and system.

The FORTH Interest Group is a non-profit organization of over 40 chapters and 3,800 members worldwide devoted to the dissemination of information about the FORTH computer language. For further information and a free Reference Card call the FIG Hot Line at (415) 962-8653 or write the FORTH Interest Group, P.O. Box 1105, San Carlos, CA 94070.

NET-WORKS II

Net-Works is an electronic bulletin board for business, home, or hobby.

Users expand your knowledge of telecommunications. Make friends and trade tips with other users. Use your computer as a night-time message center.

Net-Works automatically answers and records each phone call and asks for the caller's password or assigns one to the first-time caller. The Net-Works operator may screen the caller prior to password validation, or even charge a membership fee.

Eight "general interest" bulletin board topics can be customized by the Net-Works operator.

Net-Works provides a "welcome" message and "HELP" information for new callers. "Expert" callers see fewer menus and instructions.

Callers may send private mail to each other, post or read public bulletins, receive programs or text files, and view the membership list. Net-Works automatically notifies the caller if he/she has mail waiting.

Net-Works comes complete with an editor and other useful "utility" programs to make operating a breeze!

High Technology Software Products, Inc., P.O. Box 60406, 1611 NW 23rd, Oklahoma City, OK 73146, (405) 524-4359.

HEALTHCARE MICROCOMPUTING NETWORK

Conspectus Healthcare Market Research Division of Cronin & Associates, P.A. announced that its newsletter, *Healthcare Microcomputer Network,* is making an impact in the healthcare industry. The newsletter, now in its sixth issue, aims to bring needed changes in microcomputer usage to healthcare facilities. Its purpose is to bring health and human service people current specialized information about microcomputer technology.

Network is published monthly by Cronin & Associates of Minneapolis. Subscriptions from hospitals, human service agencies, clinics, HMOs, state agencies, universities, private physicians and health related corporation are welcome. Subscribers are linked with others across the national through the publication and *Network* "on-line" database services. Microcomputer and mainframe computer consultation services are available.

For additional information contact Kurt Oelschlager, Editor, 6600 France Ave. S., Suite 520, Minneapolis, MN 55435, (612) 926-5827.

APPLE COMPUTER PROGRAM TRANSMITS/ RECEIVES TELETYPE

COTEC announces the latest in its line of Apple][software for communications. RTTY MACHINE, like its Morse Code predecessor is designed to minimize the interface hardware. Audio tones fed into the Apple cassette input will be demodulated and decoded in software, and sent to the screen as text. Keyboard input will be encoded to Baudot and sent to the cassette output as MARK (2125 Hz) and SPACE (2295 Hz0) tones.

The receive portion of the program has two modes of operation. For AFSK which is typical of VHF/VHF operation, the program is operated in the absolute mode: 2125/2295 MARK/SPACE. For use with an HF transceiver, a second mode can be used to match the software discriminator frequency to the center of the receiver audio passband so that increased selectivity may be used.

The transmitting portion also has two modes of operation. In this first mode, each character is sent as a key is pressed. This is similar to the way the standard mechanical TTY machines operate. The second mode allows the sender to prepare and edit a message before sending it. A number of automatic formatting features are built in for operator convenience.

In addition to the cassette port interface, D.C output through the Game I/O connector is available to drive frequency shift keying circuitry and transmit/receive switching. Two printer drivers are also included in the software which converts the received signal to ASCII for generating hard copy.

RTTY MACHINE is available for $29.95 including postage and handling. California residents add sales tax. Please, no C.O.D. orders. Foreign orders add $4.00.

COTEC, 13462 Hammons Ave., Saratoga, CA 95070.

OMNI-BUFFER UNIVERSAL PRINTER BUFFER

Specifications:

- 16K expandable to 64K buffer of memory
- Serial or parallel input and output
- Serial protocols RDY/BSY, X on/X off, ETX/ACK
- Separate protocol for in/out
- Switch selectable baud rates
- On board parity (odd, even or none)
- Full Centronics implementation
- Multiple copies
- Pause control
- Individually pre-tested
- Contains own power supply

The printer buffer is a self-sufficient stand alone device which can be connected between any computer and printer having a RS-232 serial port, or a Centronics parallel port. The buffer's output ports are switch selectable by the user. The computer and the printer do not need to have the same type of port. This allows a printer with a parallel port to be connected to a computer with a serial port and vice versa. The serial ports are fully configurable by the user and speak three protocols. This allows mixing and matching of equipment with different protocols. For example, letter quality printers using ETX/ACK protocols can work with computers using X on/X off protocol.

Full Centronics implementation including buffer full, paper out, and printer-not-ready signals for handshaking.

MPC Peripherals Corp., 9424 Chesapeake Drive, San Diego, CA 92123, (619) 278-0630.

NEW PERIPHERAL BOARD FOR ARCADE STYLE GAMES

Apple owners can enjoy the same fast action, visual drama and sound effects as big arcade machines on their home computer with a new plug-in peripheral board from Synetix, Inc., Redmond, WA. Called the SuperSprite, the new board allows numerous animated objects to occupy the screen at the same time, each independent of the other or the background graphics; in effect, three-dimensional animated games or educational programs. The animated object (sprite) can be anything the user chooses to create, for example, a rocket ship, race car, dragon, or cartoon character.

The SuperSprite represents a graphics technology breakthrough in that it synchronizes Apple background graphics, animated sprite graphics (sprites are large programmable characters that move independently on the screen), sound effects and synthesized speech and presents all these elements on the screen simultaneously. The easy to install SuperSprite board simply plugs into the Apple's #7 expansion slot. The Apple video and SuperSprite video are now synchronized relative to sound, graphics and software.

Because the SuperSprite offers multiple video planes, i.e., each sprite occupies space on a separate video plane, the sprites freely move over each other without physically clashing or obliterating themselves or the background. Thus, sprite action can be introduced to existing Apple graphics backgrounds as well. Also, a "paint brush" sequence with SuperSprite allows the user to create any imaginable background setting.

The SuperSprite board offers sixteen colors for sprites and patterns, and additional colors can be created by mixing two or more standard colors.

In addition to giving home programmer's a creative outlet for generating games and graphics, the SuperSprite has significant implications for commercial game writers, enabling them to quickly devise arcade quality graphics and action sequences.

The SuperSprite board with software utilities, which include an Operator's Manual and demo diskettes, will retail for $395.00. The price includes the ECHO II speech synthesizer and a speaker.

For further information, contact Pam Johnson, Synetix Inc., 15050 N.E. 95th, Redmond, WA 98052. Phone (206) 881-7110, (800) 426-7412.

TITAN EMPIRE AN EDUCATIONAL SPACE THRILLER FOR THE APPLE

MUSE, the leader in quality software, announces the release of Titan Empire by Ed Zaron, the space adventure that teaches about our solar system while you defend the planets in an exciting video game requiring both quick reflexes and clear strategic planning.

The evil Titans are trying to take over the entire solar system. They have already captured Saturn, Mercury, Jupiter, and several moons, and have set them up as enemy planets. Your mission as Commander of the Starship is to conquer the Titans before they gain complete control. Realistic maps, planetary information, radar, and a space window are available to aid you in planning your strategy. As you travel deep into space to capture the unfriendly moons and planets you meet head-on with warring enemy ships. Use your photon torpedos and tracking missiles to fight them off, then beam down armies to regain the planet as friendly territory.

Titan Empire is a fun and challenging outer space game that has great educational value. You will travel through a realistic orbiting solar system containing all of the planets and their major moons. Learn their names, characteristics and relative positions in space.

Fine features enhancing Titan Empire include keyboard control, help screens, speed control, and a pause game capability. The documentation gives the origin of our solar system and a brief description of each of the planets, moons and the Sun. Titan Empire for the Apple][,][+, or *IIe* requires 48K and Applesoft ROM. Retail price: $34.95. Available at computer stores nationwide and directly from MUSE Software, 347 N. Charles St., Baltimore, MD 21201.

FAST A/D CONVERTER

The Lawson Labs, Inc. Model 34 *Fast A/D Converter* will become available on October 1, 1983. It features 12-bit resolution and data acquisition rates of up to 40,000 samples per second. Overall accuracy is 0.1%, five times better than A/D converters selling for considerably more. The Model 34 will handle 8 input channels in the range of 0-10 volts. A five-bit optically isolated digital output port is included as a standard feature. The output port is compatible with other Lawson Lab products. Applications support and custom hardware are also available from Lawson Labs, Inc.

The introductory price, including connectors, manual and one-year warranty, will be $375.

Model 20, Thermocouple Thermometer

The Lawson Labs Model 20 Thermocouple Amplifier in combination with the Model 14 Analog Interface card allows an Apple][® computer to be used as a multi-channel thermometer. Thermocouples are sturdy, accurate temperature sensors suited for a wide variety of applications. Low-cost thermocouples are available for measuring temperatures from near absolute zero to 1371 degrees Centigrade (2500 degrees Fahrenheit).

The Model 20 is available in two-and six-channel versions. Four Model 20's can be used with one Model 14 Analog Interface to allow for 24 separate temperature sensors. The price including one year warranty and manual is $135 for the 2-Channel and $155 for the 6-channel version.

Lawson Labs, Inc., 5700 Raibe Road, Columbia Falls, MT 59912, (406) 387-5355.

APPLE COMPUTER ANNOUNCES NEW DOS FOR THE][

A new disk operating system for the Apple *II* family of personal computers is now being licensed by Apple Computer, Inc. to software developers for applications developement.

Called ProDOS™, it provides increased compatibility between Apple *II* and Apple III environments and the higher performance required for more sophis-
ticated Apple II applications.

ProDOS uses the hierarchical file structure, file-naming conventions, and data formats of the Apple III Sophisticated Operating System (SOS). ProDOS data files and data media are interchangeable between the Apple *II* and Apple III.

The design of ProDOS frees the Apple *II* from the physical limitations of the 143-kilobyte Apple Disk II drive. Using ProDOS, the Apple *II* can handle larger files, such as those often required by word-processing and data-base applications and can recognize any storage device, either floppy or hard disk, that uses Apple's protocols. ProDOS-based applications will never need to be rewritten to recognize new storage devices for the Apple *II*.

In addition, the hierarchical, Unix-like file structure of ProDOS provides the Apple *II* user with an organized method for managing larger numbers of files on larger storage devices.

ProDOS supports interrupt-driven processing, which is required for technically advanced applications such as networking and data communications. Because it shares common data formats with SOS, ProDOS supports mixed network environments, such as Apple's forthcoming local area network, AppleNet.

(continued on page 80)

THE GAMING ROOM

Val J. Golding

GENERALLY speaking, reviews are tough to write. The reviewer must be able to supply an objective look at the product under review. He or she must have knowledge of similar products to be able to quantify the strong and weak points of the present product, and perhaps establish criteria for comparison.

In software this almost always includes the much-overworked expressions "user-friendliness" and "idiot-proofing," along with ease of use, speed, documentation, etc. In books one always wants to know how well it is organized and laid out and its understandability. A hardware review would certainly include a look at the quality of the craftsmanship.

We have reviewed many varieties of software, books, magazines and yes, even furniture. Always we try to be as factual and objective as possible. One does not necessarily need to even *like* nor for that matter, *use* a product in order to analyze it and present the results in writing.

Games are the exception; perhaps that proves the rule. Game playing is a highly subjective experience, one in which you often set many of the ground rules — play against the computer, with a partner, how many enemy craft, etc. — these give yourself what is, in your subjective experience, the advantages. Reviewing a game, once the rules and display are described, is the antithesis.

What a reviewer may term difficult, for example, in downgrading a particular game, may to another be just the challenge he or she is looking for. If our personal tastes run to a game which requires a high degree of thought and concentration between moves, and your idea of a great game is one in which 23 Tzavian cruisers approach you simultaneously from umpteen different directions, with an extra dimension or two thrown in for good measure, then we are talking about subjective feelings.

It is wise, therefore, to approach any game review with this thought in mind. One man's meat is another man's poison. Pay attention to the details of levels of complexity, keyboard control, etc., and sprinkle a few crystals of salt on the reviewer's preferences.

The Gaming Room is your column. Readers are encouraged to submit mini-reviews of *current* games or hints on how to win, or new ways to slay the dragon, etc.

Trompers *$29.95*
Avant-Garde Creations, Inc.
P.O. Box 30160
Eugene, OR 97403
Copy Protected
Back-up diskette $10.00

Trompers is a deceivingly simple game. The premise is that dog-catcher Arnold Strump is a ham radio operator who has unwittingly sent a welcome message to some fun-loving aliens on a distant planet and unleashed them on Earth. Unfortunately, as their ships arrive, they plummet from the sky like ripe apples on the first of September, and poor Arnold finds himself stuck in his new role as a Tromper-catcher and must capture the aliens before they overrun the Earth.

While Arnold's eyes are turned skyward, ever on the alert for the descending aliens, the arrow keys control his motion back and forth, while the "W" key will cause him to jump up and bag a descending alien with his net. Naturally, if he misses, the possibility exists that a Tromper may tromp on him, thus ending his mortal existence. Poor Arnold... one down and five to go. If he is lucky, the alien will bounce and he'll get a second chance.

As with so many games of this type, there are five levels of skill the user may select. A real plus for Trompers is the manner in which scoring is handled. At level one, a single point is awarded for each alien bagged. At level two, two points are given and, as you might expect, five points per capture can be made in level five. This idea, implemented in other games, could go a long way in giving the player a fighting chance. Also as one might expect, the higher the level, the more numerous are Arnold's hazards, such as the open man-holes.

This is one we went into looking for more than it had to offer, and came out of it impressed with how much fun can be had with a fairly unsophisticated game. Nevertheless, the graphics are very well done, the controls (keyboard or joystick) respond promptly and correctly, and the screen display is neat and uncluttered. The scores for the current game, as well as high score for the session are always in view, but no provision is made for saving the high score to disk.

After three or four hours of play, our scores were running in the seventies — probably nothing to brag about. When playing at level five (with keyboard), we found our hand and fingers tiring rapidly from the fast action.

Of course Trompers is copy-protected, but it should be noted that since the protection scheme checks the monitor ROM, it will not boot with the old monitor ROM (we fooled it), thus it *may* not run on an Apple *IIe*, so check it out first. The price is right, it's nice entertainment, but it could wear thin after a while.

MORE INFORMATION about the products and services in this issue FREE!

Just circle the number and fill out the card. (Note: card expires three months following month of publication.)

READER SERVICE CARD

Free Information on the items circled

Card Expires December 31, 1983 (10-83)

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1. What kind of product(s) are you likely to buy in the next three months?

A. ☐ Hard Disk
B. ☐ Increased Capacity Floppy Disk
C. ☐ Apple Compatible Floppy Disk
D. ☐ Computer
E. ☐ Printer
F. ☐ Modem
G. ☐ CRT

2. More information on Apple PugetSound Program Library Exchange? A. ☐ Yes B. ☐ No

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John Besnard, the author of *Pensate,* is to be congratulated. He has come up with a new game that adheres to the logical alternative planning principles of chess, yet is completely unique in establishing the rules of play, pieces, etc. in what could be a real winner.

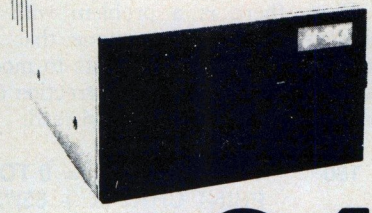
For $19.95, this game has more features and options than we have ever seen at that price.

- The ROUND option allows selection of the number of playing pieces, from four to 25.
- LEVEL determines the complexity of the playing pieces, e.g., pawn vs knight.
- SPEED selects the speed with which board pieces move. A slower speed would aid the player to follow the move in detail.
- RETRACE is a toggle option to prevent re-occupancy of a square.

Two of the more interesting options are the "instant replay" feature or a chance to revert to the parameters of the last played game. Each game is assigned a unique hexadecimal identification number, and by noting this game ID number, along with the round and level, a game may be replayed at any time.

The only thing we found that could have been improved on was the clumsy manner in which the game ID was assigned such as the unnecessary need for the player to add leading zeroes, etc., although even this is relatively inconsequential. If you only played a few dozen games, your cost would be pennies per game. Love it, love it.

Laing Electronics



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WRITING THE WRONGS

the wrongdoers

Searching Sector Search

Dear Val,

I'M ashamed to admit I've just gotten around to reading "All About DOS" after having received it a couple of months ago. I saw your outstanding article and program titled "Sector Search." Just what I need, I thought, to accompany my own version of Disk ZAP. These two ought to make a fine operating pair. I soon discovered the program was performing in a somewhat inconsistent manner; that is, it didn't always find values I knew were present in certain disk sectors. After trying several ploys to isolate the problem, I finally realized the sector search wasn't going deep enough. That is, it was exiting the search via the subroutine "REJOIN" before reaching the end of the sector buffer; and worse yet, it was exiting in a random manner. The culprit is the instruction located at line 221 in the source listing:

```
221    CMP    SECTBUF
```

This instruction will work properly if it and line 675 are changed to read:

```
221    CMP    #<SECTBUF
675 SECTBUF = DCT+178
```

The machine code patch is as follows:

```
097E  C9 00   CMP #00
0980  EA      NOP
```

Needless to say, I've "enhanced" it (don't we all do that?) to include decimal track and sector readouts, some reformatting and various idiot checks that don't interfere with the main line processing as well as the aforementioned bug. I've used your routine as a learning tool in hopes of getting somewhat proficient at the art of assembling machine code programs. Thanks for the excellent program.

Murray F. (Jack) Pennock
4001 Constellation Road
Lompoc, CA 93436

&PEEK/&POKE Correction

There is an error in &PEEK/&POKE (Taking a Bigger Byte, February 1983, page 27). When &PEEK returns an address value, it fails to check that the variable is numeric or floating point. The variable can be checked for numeric by inserting the following statement before line #09 (TAX):

```
JSR CHKNUM  $DD6A,
            check for numeric
```

The floating point check is inserted before line #91 (JSR MOVEMF):

```
LDA INTFLG  $12
for integer test
BMI ERR0  branch if integer
```

The error branch is inserted before line #93 (HIVAL):

```
ERR0 JMP MMCH  mismatch
error
```

And the following definitions can be added at the beginning of the routine:

```
CHKNUM EQU $DD6A check
for numeric
INTFLG   EQU $12  integer flag
MMCH     EQU $DD76
mismatch error message
```

This should avoid any problems if a character string variable or integer variable is used as the output for &PEEK (second argument). My thanks to C. Bongers for pointing this out.

Ken Kashmarek

Additional Comments on A Bug in LTXT

As R. D. Purves points out, changing the attribute byte for the INIT command ($A909) can have serious side effects. This is pointed out by the code explanation found in *Beneath Apple DOS* (Worth & Lechner, Quality Software) on page 8–21 (file manager external entry point, $AAFD) and page 8–22 (common open routine, $AB28). If new files are not allowed, then a return code of 6 is set (FILE NOT FOUND). However, FID and DOS Tool Kit Assembler assume that new files are allowed (after all, DOS is assuming that the INIT attribute byte has not been changed).

This could have been covered had FID and Tool Kit Assembler checked the return code to see if the file was allocated. A return code of 6 indicates that the file was not allocated even though the file manager was called with register X set to zero to allow new file allocation. If the file was not allocated, then the file was not opened, and the buffer and file manager work area are not set up. This explains why DOS was overwritten, since a null track sector list was used (all entries were zeros). This also explains why there was no directory entry for the file since it was not allocated.

The lesson here: be sure that modifications to DOS do not change any assumptions made by DOS that are necessary for successful operation. The flag to allow new files for INIT and the flag to disallow new files for LOAD are absolutely necessary. In addition, always, but *always* check the file manager return code if your assembly language routines call DOS directly. The burden is on the programmer since DOS has done its job and passed the result back to the calling program.

While I did lose a few copies of DOS, I certainly did learn a lot about the way DOS works. I prefer to learn from the mistakes of others, but not by making the same mistake. While I found the problem, Mr. Purves found the correction, and we can all learn from the experience. In this case, LTXT can be used as initially desired by putting it somewhere else in the command table (CHAIN for example), and merely disabling INIT, but not changing the INIT attribute bytes. Now, where can I put the STXT (save text) command?

Ken Kashmarek

Recipe File

Dear Val,

Ever since my article "An Apple in the Kitchen" was published in *Call –A.P.P.L.E.* back in February, I have been deluged with letters and phone calls. Most of the communication is from readers who have experienced some difficulty typing in the lengthy "Recipe File" program.

It has been exciting and enjoyable for me to hear from so many friendly Apple people "out there," and the correspondence has resulted in a few corrections to the program listing published in February.

First, there is a problem with the category directory subroutine that surfaces when the user attempts to modify the category names. The correction only affects line 180, which should read:

```
180    VTAB 6: FOR X = 0 TO 4:
       PRINT CHR$ (X + 65)">"
       CT$(X): HTAB 21: PRINT
       CHR$ (X + 70)">"CT$ (X
       + 5): NEXT
```

Also, four somewhat important REMark statements were deleted from the printout in the February issue, probably to save space. Unfortunately, these four REMs create a border for the program's title page when they are LISTed to the screen. The four missing REMs are:

```
63000 REM**********************
*
63001 REM* *
63020 REM* *
63021 REM**********************
*
```

Thanks for your time, and for putting up with my program's bug collection.

Jim Ganz

A Call —A.P.P.L.E. REVIEW:

COMPUTER WORKSTATION

Val J. Golding/reviewer

CT101 Computer Table *$129.95*
Bush Industries, Inc.
P.O. Box 231
Little Valley, NY 14755

THE CT101 is a sturdy computer work station, constructed primarily from 3/4" masonite with an attractive wood grain finish, mounted on casters for easy portability. It is 36" wide with three shelves and a small drawer, more than adequate for a computer, disk drives, monitor and printer.

When fully assembled, the CT101 becomes quite a handsome piece of furniture which would not be out of place in a living room. Assuming, of course, that you would want computer equipment in your front room. The casters with which it is equipped makes it very light on its feet (it weighs about 50 pounds or so) and can be rolled from one location to another with one hand.

Our skill in the field of carpentry (or anything mechanical, for that matter) is pretty much limited to the decision-making process — such as making a decision as to whether or not a nail should be driven with the point down or up — or making sure that the legs of a table are at least within an inch or two of being of equal length.

So it was with some trepidation that we ordered a computer work station for the editorial department. Naturally, it was shipped "knocked-down," thus when it arrived, we rushed the package to the back room, where it gathered dust until such time as a need was found.

That need became fact one August day when we were told we would be receiving a new computer the next day. Our fears returned. We recalled the hours upon hours it took us to assemble some units of steel shelving for our hi-fi equipment at home, the missing parts, the out-of-alignment bolt holes. Bravely, we turned to our project, marched to the back room, slit open the carton and surprise: Out popped an easy-to-read, two sided, 11x17, illustrated instruction sheet.

After glancing at the sheet, we zipped out and picked up one regular and one Phillips head screwdriver, the only tools we would need, according to Bush's instructions.

Returning, the clock was started, and at the end of an hour, several major pieces were assembled and standing on their own. So far the directions had been easy to follow, the pictorials accurate. Not once did we need to take anything apart and reassemble it correctly. What's more, to our surprise, everything fit correctly.

Starting on our second hour, we hit our first (and only) stumbling block, installing the drawer. The drawer is designed to slide on four plastic glides, which are fitted into pre-drilled holes. When we first attempted to install the drawer, we immediately found that the plastic glides projected much too far from their panels to accommodate the grooves in the drawer, and we were unsuccessful at forcing them further in, even using a towel wrapped around our fingers.

One more trip to our house, however, to pick up a hammer, brought an easy resolution. Three or four moderate taps drove the glides in and the drawer matched perfectly.

From here, all again went smoothly, and our total assembly time was about 1-¾ hours. If you want an attractive computer work station, and are interested in saving a couple hundred bucks, then the CT101 by Bush Industries is definitely worth looking into. Bush does not sell direct mail order, but you may wish to call them to find a local dealer that handles their line. In addition, if A.P.P.L.E. were to receive sufficient requests, we would consider adding the CT101 to those products available to our members.

```
]LIST

5  REM

     SO WHAT DID YOU
       EXPECT?

GARTH BAULCH : CALL
      -A.P.P.L.E.

10  TEXT : HOME
20  POKE 32,100: POKE
      35,25
30  POKE 33,1: HOME
      : SPEED= 0: PRINT
      "EXPECT? OSW AH
      TID DOY U";
50  SPEED= 255: TEXT
      : VTAB 1
```

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Circle 28 on Reader Service Card

A DOS SELF-SYNCH DEMO

John Webster

THE following program serves two purposes: First, it illustrates the fascinating way DOS finds out where it is when it settles itself down onto a disk to read or write data; and, sec-

is when it settles itself down onto a disk to read or write data; and, sec-

ondly, it provides an illustration of how computers may be used in classrooms to illustrate lectures.

Although "Run a slide show on your computer" programs abound for the Apple, it doesn't make a lot of sense, to me, to use a $2,000 computer to simulate a $300 slide projector. Especially when you consider the reduced resolution and storage capability of the computer over the standard Kodak carousel.

It is possible, however, to introduce elements of animation and interaction into computer displays that would be impossible with a slide projector. The following program is an example of using the computer to help illustrate and visualize a theoretical concept.

The Example

Did you ever wonder how your Apple DOS figures out where it is on the disk when it plunks the head down for a hearty READ or WRITE? It knows which track it's on because it positions the head over one of the 35 tracks (using a stepper motor) before it drops the head. That's easy. But the disk is spinning at 300 rpm. How does DOS find out which of the 16 sectors it happens to fall on? That's not too difficult either, because when you initialize a disk, one of the things that happens is that DOS records a whole lot of address and data markers on each track so that when it comes back again to READ or WRITE it can find its way around. The real question is: How does it know where a byte starts so it can read these address markers? The binary information recorded on a disk is just one continuous "stream" of 1's and 0's and looking at this stream, there is no apparent way to tell when a byte starts or ends.

Consider the following bit stream:

1001010001110100110. . . etc.

```
]LIST

10  REM

SELF-SYNC DEMO BY JOHN WEBSTER

 CALL -A.P.P.L.E. : Oct. 1983

15  TEXT : HOME
20  HTAB 7: VTAB 2: PRINT "*** AP
    PLE SELF-SYNC DEMO ***"
30  VTAB 4: HTAB 6: PRINT "(SELF-
    SYNC BYTE = 1111111100)"
40 B$ = ""
50  REM
LOAD AND DISPLAY BITSTREAM (B$)

60  FOR I = 1 TO 10
70 B$ = B$ + "1111111100"
80  NEXT
90 X = 1:B = 0
100  GOSUB 640
110  VTAB 13: HTAB 6: PRINT "ADJU
    ST PADDLE 0 TO POSITION"
120  HTAB 8: PRINT "THE HEAD INDI
    CATOR (^)."
130  PRINT : PRINT : PRINT : PRINT

140  HTAB 2: PRINT "THEN PRESS BU
    TTON(0) TO READ A BYTE."
150  REM
POSITION HEAD POINTER WITH PDL 0

160 H =  INT ( PDL (0) / 10) + 1
170  IF H > 20 THEN H = 20
180  VTAB 7: HTAB H:Q = H + 7
190  PRINT "       ^       "
200  REM
WAIT FOR BUTTON

210  IF  PEEK ( - 16287) < 127 THEN
    160
220  IF  PEEK ( - 16287) < 127 THEN
    160
230  PRINT : CALL  - 958: REM
CLEAR TO END OF SCREEN

240  REM
READ BYTE

250  VTAB 8
260  FOR I = 0 TO 5
270  HTAB 10
280 BYTE$ =  MID$ (B$,7 + H + 8 *
    I,8)
290  REM
IGNORE LEADING ZERO
300  REM
SHIFT BITSTREAM LEFT

310  IF  LEFT$ (BYTE$,1) = "0" THEN
    H = H + 1:X = X + 1: GOSUB 7
    20: GOSUB 640: GOTO 280
320  REM
ASSEMBLE AND DISPLAY VALID BYTE
330  REM
RING BELL AND SHIFT BITSTREAM

340  VTAB 8 + I:SV = 9 + I:SH = 1
    3: PRINT : PRINT "BYTE # ";I
     + 1;" IS ";
350  FOR K = 1 TO 8
360  VTAB SV: HTAB SH: PRINT  MID$
    (BYTE$,K,1);:SH = SH + 1:X =
    X + 1: CALL  - 198: GOSUB 64
    0
370  NEXT
380  REM
FOUND SYNC?

390  GOSUB 690
400  IF B = 1 THEN 440
410  IF  PEEK ( - 16287) < 127 THEN
    410
420  GOTO 450
430  REM
PAUSE
```

A DOS SELF-SYNCH DEMO

If we were to start at the leftmost bit of this stream of binary digits and divide it into 8-bit bytes, the result would be:

10010100 = $94
01110100 = $74
110...etc.

If we happened to start one bit over, the numbers would become:

00101000 = $28
11101001 = $E9
10...etc.

Obviously, the results are different and, as there is no way of predicting where in this bit stream the head will find itself when it starts reading, it becomes an interesting problem indeed.

The solution to the problem develops from two facts. The first is a necessary constraint the designers put on the system: only bytes containing a 1 in the leftmost position can be written or read from a disk. (Aha! you'll say. But, what about the other numbers I might want to use?) Because this limits the number of specific bytes that can be recorded on a disk, it becomes necessary to encode the byte you want to record into more than one byte on the disk. This is a fairly complicated procedure but as DOS looks after it all for us, we don't have to worry about it.

The second thing that makes it possible to find the proper beginning of a recorded byte is a clever technique using something called self-sync bytes. A self-sync byte is an $FF with a difference. Instead of consisting of eight bits, like every other byte, a self-sync byte contains ten bits: 8-one's and 2-zeros. Thus a bit-stream of self-sync bytes looks like: 1110011111111001111111100111111 1100111111110011 etc.

When a disk is initialized, several areas on each track are recorded with a stream of self-sync bytes. Because the hardware will ignore leading zeroes on the left end of bytes, it is only necessary for DOS to read *five* consecutive self-sync bytes before it knows for sure that it is synchronized with the data and is reading bytes properly.

This last statement is probably not self-evident and it is to illustrate the mechanism involved that the Self-sync Demo program was written. The program allows you to position the "head" anywhere in a self-sync stream and then simulate what happens as five consecutive bytes are read.

For a more detailed explanation of this and other DOS procedures, see Don Worth & Pieter Lechner's excellent book *Beneath Apple DOS,* Quality Software, available also to A.P.P.L.E. members.

The program

The program is designed to be used in an instructional situation and may be incorporated into (or RUN from) a larger program that shows High-Res pictures of disks, generates other text or whatever. Control of the "head" positioning and byte reading is done through game paddle (0) to allow remote operation. The program could be easily modified for keyboard control. The check for button (0) pressed (lines 210, 220 and 600, 610) is done twice for reliability.

When the demonstration is finished, pressing button (0) will repeat the demo and hitting the space bar will terminate the program. It would also be very easy to modify line 590 to RUN some subsequent demonstration or display.

```
440  FOR K = 1 TO 500: NEXT
450  NEXT
460  REM
PRINT FINAL MESSAGE

470  SPEED= 150
480  VTAB 16: HTAB 3: PRINT "SYNC
     HRONIZATION IS GUARANTEED AFTER"
490  VTAB 18: HTAB 10: PRINT "FIV
     E BYTES ARE READ."
500  FOR K = 1 TO 5000: NEXT
510  VTAB 16: HTAB 2: PRINT " AFT
     ER SYNCHRONIZATION IS ACHIEV
     ED  ": PRINT
520  PRINT "DOS LOOKS FOR  $D5 AA
      96  WHICH BEGINS": PRINT
530  PRINT "EACH ADDRESS FIELD.
     IT THEN READS": PRINT
540  PRINT "THE ADDRESS TO FIND O
     UT WHERE IT IS ON": PRINT
550  HTAB 15: PRINT "THE TRACK.";

560  SPEED= 255
570  REM
WAIT FOR BUTTON(0) TO RESTART
OR KEY TO STOP

580  POKE 49168,0: REM
RESET KEYBD
590  IF  PEEK ( - 16384) ) 127 THEN
      POKE 49168,0: HOME : END
600  IF  PEEK ( - 16287) ( 127 THEN
     590
610  IF  PEEK ( - 16287) ( 127 THEN
     590
620  GOTO 10
630  REM
DISPLAY BITSTREAM
640  REM
SPEED= 200

650  HTAB 1: VTAB 6: PRINT  MID$
     (B$,X,40)
660  SPEED= 255
670  RETURN
680  REM
PRINT BINGO

690  IF BYTE$ = "11111111" THEN  VTAB
     SV: HTAB 22: SPEED= 255: FLASH
     : PRINT "*** BINGO ***": NORMAL
     : CALL  - 958
700 B = 1
710  RETURN
720  INVERSE
730  REM
"IGNORE ZERO" MESSAGE

740  HTAB Q: VTAB 5: PRINT "V  IG
     NORE ZERO": NORMAL
750  FOR J = 1 TO 30: FOR K = 1 TO
     20: NEXT :Y =  PEEK ( - 1633
     6): NEXT
760  HTAB Q: VTAB 5: PRINT "
                "
770  RETURN
780  PRINT  PEEK ( - 16287): GOTO 780
```

ESCAPING A MENTAL PLATEAU:

WHAT DO I DO NOW, DADDY?

David G. Sparks/Call —A.P.P.L.E. staff writer

PLA-TEAU 1 a : a region of little or no change in a graphical representation b : a relatively stable level, period, or condition 2 : (as a verb) to reach such a condition : to level off.

That is a portion of Webster's definition of my present state regarding the Apple, programming, and computers in general. What personal computer owner (of more than six months' duration) has not felt this way on occasion?

I have recently come off an exceptionally productive period, which saw an article virtually every month, plus collaboration with highly gifted authors on additional projects. The grand finale came in the large-scale review of five ampersand utility packages in the March issue, and a revisit to the subject of random numbers in the May issue.

As this is written, it is late June, 1983. Beyond the attainments of the past months on behalf of *Call -A.P.P.L.E.*, I have had to meet heightened demands of my profession. I'm not seeking condolences — this has been a successful year so far and I'm pleased with it. But I'm tired and so I feel flat, unable to advance.

No one forces any of us to be authors. We walk our periodic planks of our own will, eyes open. Each article is a risk: it is quite likely that some readers will not like the way it was done, and there is always the fear that someone will point out a glaring, "You-know-better-than-that" error in a program listing.

Other letters and phone calls bring praise, plus requests for help in solving unique applications of the subject matter covered in the article. Pleasant enough, but still time and (more importantly) energy consuming.

The point of all this is that the job seems to cling on after the major creative push is over. Assuaging the dissatisfied, clearing up the confused, righting the wrongs, all sap strength during a time when energy should be allowed to rebuild.

There is also a sense of resignation, of defeat even at the moment of success and conclusion. Having worked against the uphill challenge of developing (one hopes) a quality article or several, one cannot rest at the summit. A mental plateau stretches from there and it must be trudged upon for a while before the next climb can begin.

I haven't been near the computer for four weeks. It took a visit from Ken Kashmarek, another writer for this journal, to get me started again. We talked about getting stalled like this.

I told Ken that I felt like I had done everything I ever would be able to do for A.P.P.L.E. members and readers. He said that wasn't so (isn't he a nice person?) He has just finished an even more usefully productive spell — you'll see his articles with great and pleasing regularity for a while — and he has nearly completed a major revision of a significant A.P.P.L.E. software product; he feels like taking a breather too. It is helpful to be told one is not alone in one's feelings.

Ken, though, is already thinking about his next major project. As he outlined it to me I kept thinking, "David, you have ideas also. Get your thumb out of your mouth and get moving." The first thing I did after he drove away was commence this article.

(The effect was startling, like popping the clutch on an XKE. If I hadn't started with a mountain terrain analogy, I would be tempted to talk about logjams bursting or corks flying from shaken bottles. But we are using plateaus in this discussion, so let's see . . .)

You can't walk forever on a plateau. Eventually you reach either an obstacle (ravine, cactus thicket, snake pit, or some such thing), a precipice, or the unsteady pile of loose stones called talus which foil the footing at the bottom of the next upward climb.

(He looked up from his reading at this point. Silence hung like glue on the faces of his classmates. One fellow, third row back, blinked disbelievingly. He turned to the instructor, a kindly old gentleman who had heard it all in one or another of his many years of guiding the uncertain talents of his young charges.

"How's that, teacher?"

"Calm down, David. Write plainly. Stick to the point. Or else you'll stub your toe on a boulder and fall off a cliff!")

Eventually these flat and idle periods must end. The test is whether one waits until circumstances force a conclusion, or acts out of choice to pursue a new path of apparent worth.

Really, there aren't any tricks in life; it all boils down to hard work. One of the things that makes work hard is that when it is finished, it has to be done the same way again the next time. My employer pays me on the basis of my productivity in a month. There's no salary, so on the first of each month I have to start all over again at zero. The clients and the products change over time, but the tasks and the techniques are relatively constant.

Writing is the same way. The ideas come and are converted into articles. But each new idea involves the same work of organizing, typing, editing and proofing the words in which it must be expressed. Here I sit, idle, and only self-indulgence keeps me from completing the new software review I promised Val I would do, or the beta test of the new product I agreed to perform. That's not to mention the programs I've promised myself to write, or the articles that will inevitably flow from the programming.

There comes a time when resting from past labor becomes lazy avoidance of labor's resumption. Whack! That's the sound of a foot (mine) striking a certain well-known anatomical landmark (also mine.) Andrea, my wife, says she hasn't heard these keys clacking so quickly in a long time. I'm moving again.

Watch this space.

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TOMORROW'S APPLES TODAY

continued from page 71

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Currently, ProDOS is available to qualified applications developers through Apple's software licensing program. It will not be available for retail sale from Apple until early 1984.

Hayes

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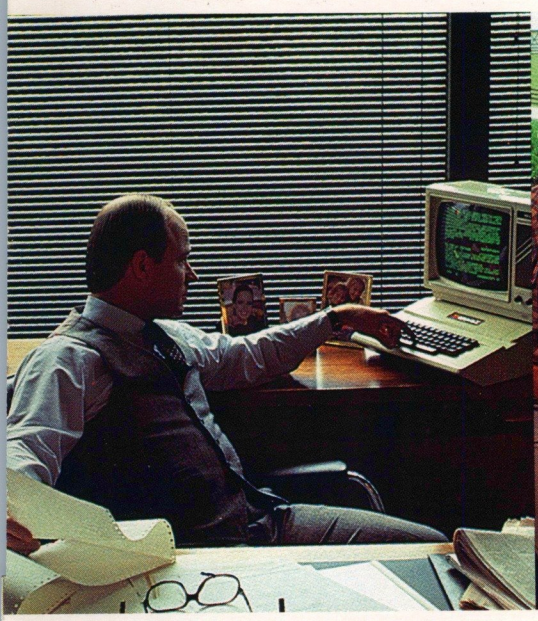

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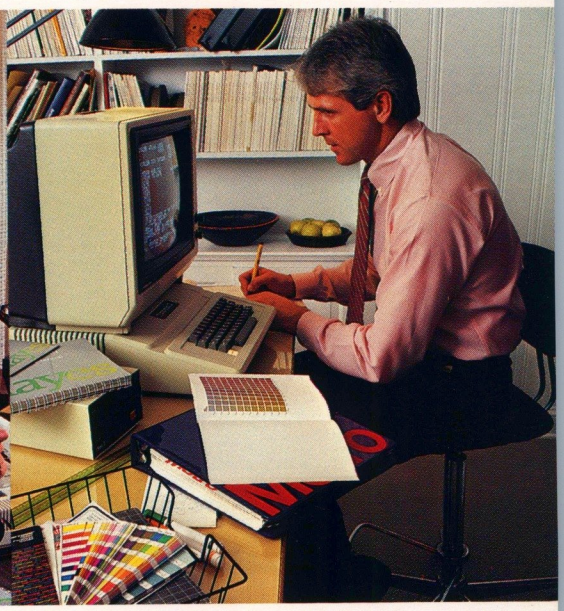

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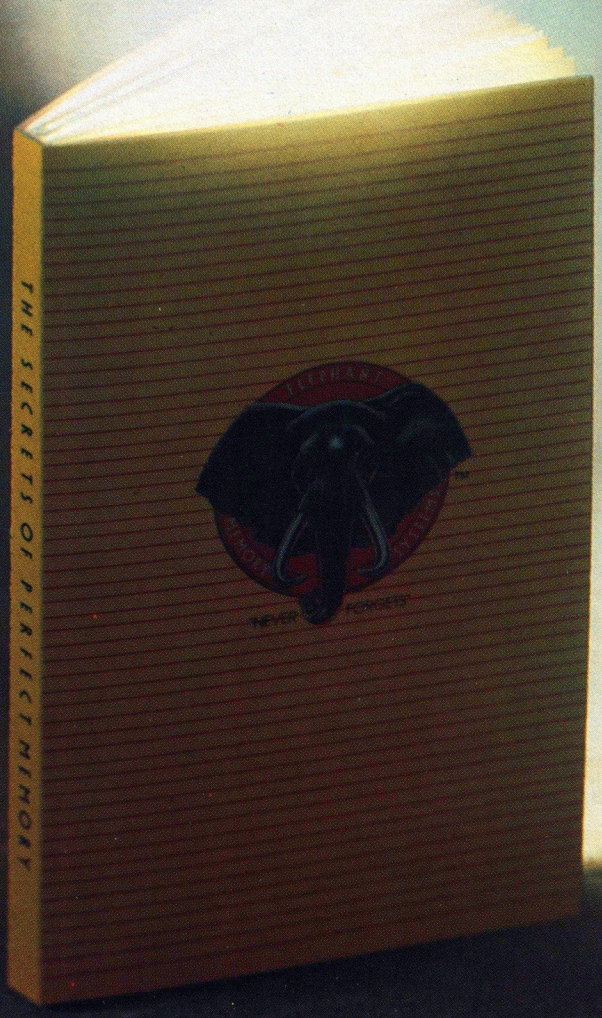

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